PHARMACIST EDUCATIONAL INTERVENTIONS FOR PATIENTS WITH ADVANCED CANCER PAIN LIVING IN THE COMMUNITY

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Pharmacist educational interventions for patients with advanced cancer pain living in the community.

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Abstract

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Pharmacist educational interventions for patients with advanced cancer pain living in the community.

Keywords: Pharmacy, Medicines optimisation, Palliative care, Remote consultation, Cancer, Pain.

Background At the end of life, patients living in their own homes experience significantly more pain than those who die in either hospital or hospice care (Office for National Statistics, 2015). With an increasing prevalence of this, person-centred medicines optimisation is essential.

Aim To investigate the feasibility of community pharmacist medicines optimisation services for patients living with advanced cancer pain in community settings.

Methods Mixed methods were used, adopting a pragmatic stance and approach. Qualitative interviews, a systematic review and meta-analysis and a proof-of-concept study were undertaken.

Results Patients with advanced cancer pain need support with their medicines which could be provided by a pharmacist. Patients experienced a significant number of medicines related problems, even those already receiving specialist palliative care. Most problems were addressed by pharmacist advice with the remainder being referred for additional prescribing.

Care for patients with cancer pain is currently not person-centred and the current medicines optimisation model is unsuitable for this patient group. An enhanced model of medicines optimisation is therefore presented for patients with advanced cancer and this model can be amended and adopted for other patient groups.

Conclusions An enhanced medicines optimisation model (MOCAP) has been created to inform person-centred medicines optimisation for patients with advanced cancer pain. Feasibility and acceptability were also confirmed and it can be adapted for further clinical use. This model contributes to the goals of the NHS agenda of choice and control of care as proposed in the NHS Long Term Plan (NHS, 2019b).

Acknowledgements

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I have benefited from support from many people during the writing of my papers and this thesis. I would particularly like to thank Professor Mike Bennett, Assistant Professor Lucy Ziegler and Professor Dave Alldred from Leeds University, and Dr Jon Silcock and Dr Duncan Petty from Bradford University who have always been on-hand to offer guidance.

I would also like to mention my colleagues in the Medicines Optimisation Research Group. Although we are all at different stages of our careers and have taken different paths, we have all enjoyed the ups and downs of research together in a nurturing and supportive environment.

Last, but not least, I would like to thank my family, without whom I would not have had the reason to carry out the research but also the support to see it through. Thank you to Lily for her lessons in grammar, Harry for the cups of tea and cuddles and Chris for his love and encouragement – even when he didn’t know what was going on! Also, to my Mum who understands why I wanted to do this and what I wanted to achieve by it.

Dedication

I dedicate this research to my Dad – Michael Steel.

"You are a child of the universe, no less than the trees and the stars." *Max Erhman*

Statement as to candidate's contribution to work done

This PhD by published work consists of:

- Four lead authored articles in peer reviewed journals

The outputs were published between February 2018 and July 2019 and none have been submitted for any other qualification at this or any other institution.

The publications are listed in order of relevance to the thesis and not necessarily the order in which they were published.

Contributions from authors are detailed in Table I (below).

Table I Contributions from authors for all papers

	Author initials					
	ZE	AB	MB	LZ	CC	DP
Paper 1 Edwards, Z., Blenkinsopp, A., Ziegler, L. and Bennett, MI. (2018). **How do patients with cancer pain view community pharmacy services? An Interview study**. Health & Social Care in the Community. 00:1-12 DOI:10.1111/hsc12549						
Study concept		✓	✓			
Study design	✓	✓		✓		
Study conduct	✓			✓		
Acquisition of data	✓					
Analysis of data	✓	✓				
Interpretation of data	✓	✓				

Drafting manuscript	✓					
Revision of manuscript	✓	✓	✓	✓		
Approval for submission	✓	✓	✓	✓	n/a	n/a
Percentage contribution (%)	60	20	10	10		
Paper 2 Edwards, Z., Ziegler, L., Craigs, C., Blenkinsopp, A. and Bennett, MI. (2019). **Pharmacist educational interventions for cancer pain management: a systematic review and meta-analysis**. International Journal of Pharmacy Practice. DOI:10.1111/ijpp12516.						
Study concept	✓	✓	✓			
Study design	✓		✓		✓	
Study conduct	✓				✓	
Acquisition of data	✓					
Analysis of data	✓				✓	
Interpretation of data	✓			✓	✓	
Drafting manuscript	✓					
Revision of manuscript	✓	✓	✓	✓	✓	
Approval for submission	✓	✓	✓	✓	✓	
Percentage contribution (%)	60	5	20	5	10	
Paper 3 Edwards, Z., Bennett, MI., Petty, DR. and Blenkinsopp, A. (2019). **Evaluating recruitment methods of patients with advanced cancer: a pragmatic opportunistic comparison.** International Journal of Pharmacy Practice. DOI:10.1111/ijpp.12562						

Study concept	✓	✓	✓			
Study design	✓	✓	✓			✓
Study conduct	✓					✓
Acquisition of data	✓					✓
Analysis of data	✓					
Interpretation of data	✓	✓				
Drafting manuscript	✓					
Revision of manuscript	✓	✓				
Approval for submission	✓	✓	✓			✓
Percentage contribution (%)	60	30	5			5
Paper 4 Edwards, Z., Bennett, MI. and Blenkinsopp, A. (2019). **A community pharmacist medicines optimisation service for patients with advanced cancer pain: a proof of concept study.** International Journal of Clinical Pharmacy. 41:700. DOI: 1007/s11096-019-00820-8.						
Study concept		✓	✓			
Study design	✓	✓	✓			
Study conduct	✓					
Acquisition of data	✓					
Analysis of data	✓	✓				
Interpretation of data	✓	✓	✓			
Drafting manuscript	✓					
Revision of manuscript	✓	✓	✓			

Approval for submission	✓	✓	✓			
Percentage contribution (%)	60	25	15			

Papers are included in Appendices 1, 2, 3 and 4.

Statements of authorship are included in Appendices 5, 6, 7, 8 and 9.

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List of Abbreviations

BMA	British Medical Association
CCG	Clinical Commissioning Group
CPPE	Centre for Postgraduate Pharmacy Education
GP	General Practitioner (family doctor)
IMPACCT	Improving the Management of Pain from Advanced Cancer in the Community
MESH	Medical Subject Headings
MOCAP	Medicines Optimisation for Cancer Pain
MOPAP	Medicines Optimisation for a Patient Population
MORG	Medicines Optimisation Research Group
MRP	Medicines Related Problem
MUR	Medicines Use Review
NCRI	National Cancer Research Institute
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
NIHR	National Institute of Health Research
NMS	New Medicine Service
PCNE	Pharmaceutical Care Network Europe

PMR	Patient Medication Record
PPI	Patient & Public Involvement Group
PSNC	Pharmaceutical Services Negotiating Committee
RCT	Randomised Controlled Trial
RP	Research Pharmacist
RPS	Royal Pharmaceutical Society
SCR	Summary Care Record
UK	United Kingdom
WHO	World Health Organisation

Publications included in this thesis

Publications included in this thesis and the study numbers to which they relate (included in Appendix 1, 2, 3 and 4)

STUDY 1

Paper 1 (Appendix 1)

Edwards, Z., Blenkinsopp, A., Ziegler, L. and Bennett, MI. (2018). **How do patients with cancer pain view community pharmacy services? An Interview study**. Health & Social Care in the Community. 26:4. Pages 507-518

DOI:10.1111/hsc12549.

https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.12549

STUDY 2

Paper 2 (Appendix 2)

Edwards, Z., Ziegler, L., Craigs, C., Blenkinsopp, A. and Bennett, MI. (2019). **Pharmacist educational interventions for cancer pain management: a systematic review and meta-analysis.** International Journal of Pharmacy Practice. Vol 27: 4, pages 336-345.

DOI:10.1111/ijpp12516.

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STUDY 3

Paper 3 (Appendix 3)

Edwards, Z., Bennett, MI., Petty, DR. and Blenkinsopp, A. (2019). **Evaluating recruitment methods of patients with advanced cancer: a pragmatic opportunistic comparison.** International Journal of Pharmacy Practice. Vol 27: 6; pages 536-544.

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Paper 4 (Appendix 4)

Edwards, Z., Bennett, MI. and Blenkinsopp, A. (2019). **A community pharmacist medicines optimisation service for patients with advanced cancer pain: a proof of concept study.** International Journal of Clinical Pharmacy. Vol 41: 3, pages 700-710.

DOI: 1007/s11096-019-00820-8.

https://link.springer.com/article/10.1007/s11096-019-00820-8

Other outputs (for information only)

Edwards, Z., Blenkinsopp, A., Ziegler, L. and Bennett, MI. (2016). **Cancer patients' views on community pharmacy pain medicines consultations in advanced cancer**. Health Services Research in Pharmacy Practice Conference, Reading 2016. IJPP Vol 24, Supp1 pp22. ISSN 0961-7671

Edwards, Z., Blenkinsopp, A. and Bennett, MI. (2017). **A survey of healthcare professionals' views on community pharmacy services for patients with**

cancer pain. Health Services Research in Pharmacy Practice Conference, Nottingham 2017.

Edwards, Z., Craigs, C., Ziegler, L., Blenkinsopp, A. and Bennett, MI. (July 2018). **Can educational interventions by pharmacists help patients with pain from cancer? A systematic review and meta-analysis**. CLARHC Palliative Care Conference, Manchester. https://www.clahrc-gm.nihr.ac.uk/projects/pal-care-conference-2018

Manzoor, A., Breen, L., Marques, I. and Edwards, Z. (2018) **How do we avoid the 'ever decreasing circles syndrome' in service improvement?** [Poster presentation]. FIP World Congress of Pharmacy and Pharmaceutical Sciences Sept 2-6, Glasgow, UK.

Bennett, MI., Allen, P., Allmark, C., Rainey, P., Robinson, D., Berwick, B., Blenkinsopp, A., Brown, Closs. J., Fleming, K., Foy, R., Godfrey, M., Hulme, C., Johnson, OA., Jones, R., Pavitt, SH., Ziegler, L., Allsop, M., Edwards, Z., Hackett, J., Howdon, D., Hughes, N., Meads, D., Mulvey, M., O'Dwyer, J., Taylor, S., Black, K., Wray, A., Fletcher, M., Hartley, S., and Wright-Hughes, A. **Improving the Management of Pain from Advanced Cancer in the Community (IMPACCT).** Monograph under review with NIHR Programme Grants for Applied Research.

Chapman, E., Edwards, Z., Fettes, L., Malia, C., Boland, J., Mulvey, M., Maddocks, M. and Bennett, M. **Practice review: Evidence-based and effective management of pain in advanced cancer patients**. Accepted by Palliative Medicine December 2019.

Chapter 1 Introduction

This chapter introduces the healthcare landscape within which this research is positioned. The concepts of medicines optimisation and person-centred care are then explored. The chapter examines how both concepts fit together, how they relate to end of life care and how they interact with each other. The profession of pharmacy and the services available in community pharmacy are introduced.

1.1 Background

Over 160,000 people die from cancer every year in the United Kingdom (UK) and three-quarters of them will suffer from pain (Cancer Research UK, 2015, Van den Beuken-van Everdingen et al., 2007). There is an increase in both those living with a diagnosis of cancer, and in those living beyond the disease (Macmillan Cancer Support, 2019).

Patients with advanced cancer spend most of their final year of life in their own homes, although they may require admission into hospital or hospice settings during this time (Adam et al., 2014). The most common reason for patients with advanced cancer to consult out-of-hours doctors or present at emergency departments is pain (Adam et al., 2014). Only 18% of patients at the end of life in community settings describe their pain as completely controlled (Office for National Statistics, 2015). This compares with 38% and 63% in hospital and hospice settings respectively showing a mismatch in symptom control between these different care settings (Office for National Statistics, 2015). Patients are increasingly choosing to die at home, but support is needed for patients who choose this to control pain symptoms, so they are able to live as well as possible in their final weeks and months (Edwards et al., 2018, Gomes et al., 2012).

Educational interventions for symptom management are information, instructions or advice delivered to patients using any medium (Bennett et al., 2009b). Such interventions for patients with cancer have been shown to have a positive effect, with improvements in pain scores, knowledge and attitudes (Bennett et al., 2009b). Educational interventions in patients with uncontrolled cancer pain are underused and could go some way to addressing the need for symptom support (Bennett et al., 2009b).

Pharmacist-delivered educational interventions (see page 36) have been shown to improve patient compliance with medication, reduce adverse effects and reduce the quantity of medicines prescribed; all of which can improve symptom control (Blenkinsopp et al., 2012, Department of Health, 2014, Bennett et al., 2011). Community pharmacists already provide educational intervention services for patients; although these are rarely carried out for patients with advanced cancer pain (Savage et al., 2013, Savage I et al., 2011). There is limited research into the impact of pharmacist educational interventions for patients with advanced cancer pain and this study aims to address this.

1.2 Medicines optimisation

The concept of medicines optimisation was introduced in 2011 and has evolved since that time (Cutler, 2011). It was intended to support patients to get the best and most efficient use of medicines and covered adherence, prescribing, value and errors (Royal Pharmaceutical Society, 2013). Medicines optimisation guidelines were developed by the Royal Pharmaceutical Society (RPS) around four key principles as shown in Figure 1.1 (Royal Pharmaceutical Society, 2013).

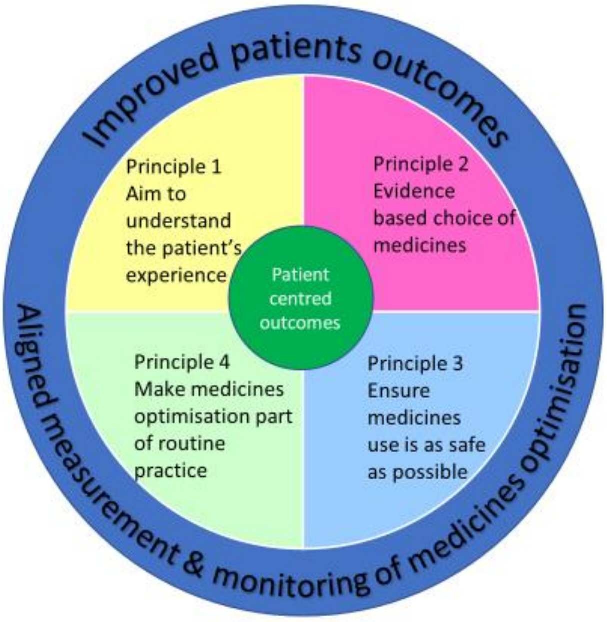


Figure 1. 1 Summary of the four principles of medicines optimisation (Royal Pharmaceutical Society, 2013)

The four principles are evidence-based and come together to provide a holistic method of ensuring medicines are safe, appropriate and that the patient is at the heart of any decision regarding their care (see Table 1.1). These principles are universal and not specific to any one condition or patient group.

Table 1. 1 A summary of the four principles of medicines optimisation

Principle 1: Aim to understand the patient’s experience	This principle aims to promote two-way, ongoing communication between the patient and healthcare professionals to ensure their views and experiences of medicines taking are listened to. Resulting shared decision making is more likely to lead to better outcomes (Martin et al., 2005).
Principle 2: Evidence-based choice of medicines	Medicines should only be prescribed for patients if they have a robust evidence-base to support their use. This will ensure the best possible outcomes are achievable for patients (Royal Pharmaceutical Society, 2013).
Principle 3: Ensure medicines use is as safe as possible	Medicines safety is concerned with accurate prescribing, supply and usage as well as side-effects and adverse events. Patients prescribed multiple medicines are more likely to experience adverse events and this is harm which can be avoided (Royal Pharmaceutical Society, 2013).
Principle 4: Make medicines optimisation part of routine practice	Improved communication between healthcare professionals and patients can improve outcomes (Martin et al., 2005). If this is routinely practiced, patients will experience better symptom control, reduced harm and there will be less waste for the NHS (National Health Service) (Royal Pharmaceutical Society, 2013).

As medicines play such an important role in maintaining health and controlling symptoms, any non-adherence to prescribed medication may lead to declines in disease state and symptom control (Royal Pharmaceutical Society, 2013). Non-adherence may lead to medicines waste and estimates in the US put the cost at up to 5 billion dollars and in the UK NHS approximately £300 million each year (Trueman P, 2010, Excellence, 2015a, Lenzer, 2014). In 2004, Barber et al reported that only 16% of patients take a newly prescribed medicine as it was intended to be taken, and that almost a third of patients are not adherent ten days after a medicine has been prescribed (Barber et al., 2004). More recently, adherence to medicine has been measured across Europe and as many as 70% of patients self-reported as non-adherent (Morrison et al., 2015). Reasons for this included beliefs around their illness and low levels of self-efficacy – if a patient doesn't understand their condition, they may not understand why they have to take their medicine (Morrison et al., 2015). Prescribing and dispensing errors in the UK cost up to £530 million each year (through readmissions) and medicines optimisation could contribute to reducing these unnecessary costs (Trueman P, 2010, Excellence, 2015a, Lenzer, 2014). As principle 2 in Table 1.1 describes, prescribing of medicines that have a strong evidence base can ensure that patients receive the best treatment available. However the prescribing of medicines lacking in evidence of clinical effectiveness is also associated with additional costs to the NHS as well as potentially denying patients access to the most effective medicines (Walker et al., 2018).

Medicines optimisation has been used within different disease groups, and services have been successfully developed based around these principles, although there is still room for improvement [26-28]. Since the introduction of the principles, community pharmacy services have been focused on principle 4 of the medicines optimisation wheel and to a lesser extent on principles 1 and 3 (see Chapter 2.3). Several working definitions of medicines optimisation exist, some of the most pertinent to this study are presented in Table 1.2. These have been considered in the context of patients with advanced cancer.

Table 1. 2 Definitions of medicines optimisation with foci and deficiency for use with advanced cancer population.

Author	Definition	Focal element	Deficiency for use for with patients advanced cancer
The Centre for Postgraduate Pharmacy Education (CPPE) (Pharmaceutical Journal, 2011: 606)	The process by which healthcare professionals engage with individual patients to understand their views, opinions and beliefs, to share their clinical and medicines knowledge so that the most appropriate evidence-based care for each individual can be agreed and, where appropriate, to communicate this with other healthcare professionals (Cutler, 2011).	• Healthcare professionals sharing clinical knowledge, understanding patients' point of view. • Evidence-based care. • Communication between agencies.	• Lack of focus on symptom management.
NHS England (NHS England, 2019: 1)	Medicines optimisation looks at the value which medicines deliver, making sure they are clinically-effective and cost effective. It is about ensuring people get the right	• Clinical effectiveness. • Cost effectiveness. • Correct medicine at correct time.	• Lack of person-centredness.

	choice of medicine, at the right time and are engaged in the process by their clinical team (NHS England, 2019).	• Engagement of patient.	• Lack of focus on symptom management.
Royal Pharmaceutical Society RPS, 2013: 3	Medicines optimisation is about ensuring that the right patients get the right choice of medicine, at the right time. By focusing on patients and their experiences, the goal is to help patients to: improve their outcomes; take their medicines correctly; avoid taking unnecessary medicines; reduce wastage of medicines; and improve medicines safety (Royal Pharmaceutical Society, 2013).	• Right medicine at the right time. • Focus on patient. • To improve outcomes.	• Lack of focus on symptom management.

As can be seen by Table 1.2, the definitions provided are varied in their focus. The CPPE definition is centred on knowledge and the NHS definition has a focus on cost. The RPS definition is focused around the patient, and intended consequences are more efficient prescribing, better outcomes for patients and improved safety (Royal Pharmaceutical Society, 2013, Duerden. M et al., 2013). The definitions are clearly aligned with the organisations that they represent. Patients' views need to be paramount in any conversation about their care, otherwise the intended health benefits of medicines may not be seen. Communication should be tailored to the individual patient's needs as they may forget what information their prescriber has given them, fail to understand what they have heard or simply choose to ignore instructions for their medicines (Martin et al., 2005). This emphasis on involving the patient in decisions about their health is included in the new NHS Long Term Plan (NHS, 2019b).

When reviewing the definitions provided in Figure 1.2 it is clear that two of these refer to improvement of outcomes. When looking at an advanced cancer population who are nearing the end of life, outcomes discussed are often those of place of death (compared with where the patient had chosen), access to supportive care and whether documentation was filled in correctly (Waller et al., 2017, Kim and Tam, 2016). In terms of these definitions, long-term outcomes are not appropriate for this patient group, however, outcomes could be assessed in terms of management of pain and other troubling symptoms.

1.3 Person-centred care

Person-centred care makes the patient the focus of all the care they receive (The Health Foundation, 2019). Patients and health and social care professionals work together to achieve the best health outcomes and patients are supported to improve their knowledge and skills to enable them to manage their condition more independently (The Health Foundation, 2019). As an integral part of all decisions made about them; patients feel more empowered to take on the self-management role where they feel comfortable to do this.

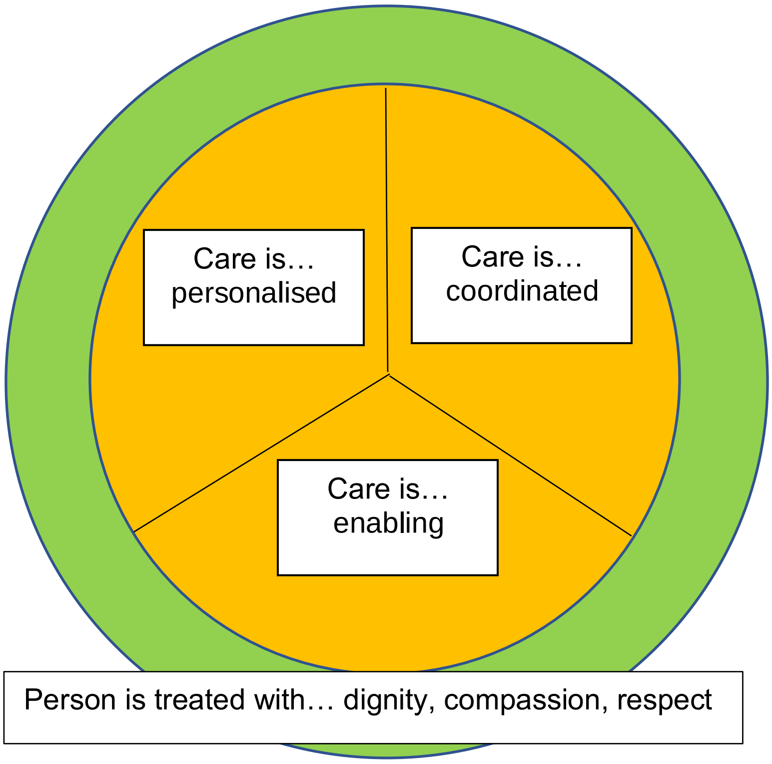


Figure 1. 2 The four principles of person-centred care The Health Foundation 2019: 1 (The Health Foundation, 2019)

Figure 1.2 show the principles of person-centred care. The care of patients should be co-ordinated across healthcare specialisms but personalised to the needs and preferences of individual patients. These, and the fundamental requirement of the NHS values to treat patients with dignity, compassion and respect, tie together to empower the patient to support themselves and manage their conditions (The Health Foundation, 2019, NHS & Health Education England, 2019).

The principles of person-centred care have been widely used and applied both in the UK and internationally by multiple healthcare professionals working in different disease states (Alzheimer's Society, 2019, Royal College of Nursing, 2016, Health Education England, 2019, Hospital Pharmacy Europe, 2019, Medicines Optimisation Innovation Centre (MOIC), 2018). The concept and ideas are continuing to develop in the NHS with increasing emphasis on the needs of the patients with ideas such as remote consultations and digital access for patients (NHS, 2019b, NHS England & British Medical Association, 2019). Measurement of person-centred care is problematic due to the lack of an empirical definition and is usually based on either components of care such as communication or the wider holistic concept (The Health Foundation, 2014). There is no accepted way of measuring person-centred care, partially due to measurement being subjective (what one person might think of as being person-centred, someone else may disagree with) (Mead and Bower, 2000). Person-centredness also refers to the coordination of services and the complex nature of health provision delivered by several different healthcare professionals for a patient towards the end of life makes developing a measure very difficult. Principles of person-centred care are being achieved inconsistently or in certain areas such as care planning and family and carer support they are not achieved the majority of the time (National Voices, 2017). According to a 2017 report by National Voices, coordination of care is not yet measured, although the continued role out of integrated care systems aims to improve joint working so this may change in the future (National Voices, 2017, NHS, 2019a).

New treatments and services developed within the NHS are now routinely done so with the help of patients with involvement in research development, study conduct and evaluation. Patient involvement in research ensures their needs and views are taken into consideration thus improving the quality and appropriateness of research (Brett. J, 2014, National Institute of Health Research, 2019).

1.4 Person-centred care at the end of life

Person-centred care at the end of life means care that is tailored to suit the individual needs of each patient approaching the end of life rather than assuming everybody’s needs are the same. This includes where and when they wish to receive their care and the level of control they would like to have as well as the expectation that healthcare professionals will work together with each other and the patient to ensure that the end of the patient’s life is as they would want it to be (Mistry et al., 2015). Person-centred care has been adopted and integrated into recent guidelines for improved care at the end of life (NHS, 2019b, The National Council for Palliative Care & VOICES, 2015, Excellence, 2015b).

The NHS Long Term Plan identified that end of life care would benefit from an increase in personalisation of services (NHS, 2019b). The Ambitions for Palliative and End of Life Care published in 2015, comprise six ambitions to improve care at the end of life and were devised by a partnership of organisations (National Palliative and End of Life Care Partnership, 2015). These ambitions are shown in Table 1.3 and are all person-centred in their focus.

Table 1. 3 **Ambitions of Palliative and End of Life Care** (National Palliative and End of Life Care Partnership, 2015)

1. Each person is seen as an individual.
2. Each person gets fair access to care.
3. Maximising comfort and wellbeing.
4. Care is coordinated.
5. All staff are prepared to care.
6. Each community is prepared to help.

‘Every moment counts’ was also produced in 2015 by National Voices and The National Council for Palliative Care and uses the words of patients and reflections of healthcare professionals to outline person-centred themes (The National Council for Palliative Care & VOICES, 2015). Five statements resulted, and these include issues of control, honesty and choices as shown in Table 1.4.

Table 1. 4 The five statements from ‘Every moment counts’

1. We work for my goals and the quality of my life and death.
2. I have honest discussions and the chance to plan.
3. The people who are important to me are at the centre of my support.
4. My physical, emotional, spiritual and practical needs are me.
5. I have responsive, timely support day and night.

The 2017 report by National Voices found that person-centred care at the end of life is not being implemented widely enough in practice and that care needs to be individually tailored to the needs of the patient (National Voices, 2017, Riley, 2017). It warns against a ‘tick-box’ exercise with one measure (such as ‘preferred place of death’) being an indicator that care is person-centred but promotes a whole system, whole population approach where each person and the network around them is seen individually with specific needs and preferences (Riley, 2017).

Patients at the end of life need person-centred care that is specifically designed and adapted around them and their needs and preferences (Care Quality Commission, 2019). Person-centred medicines optimisation at the end of life is currently under explored and this thesis will address this gap in the literature.

1.5 The profession of pharmacy

Pharmacy is increasingly diverse as a profession and what used to be a choice between a career in hospital, community or industry has now evolved to include other roles. Pharmacists are now working in General Practitioner (GP) practices and Clinical Commissioning Groups (CCGs) alongside other healthcare professionals in roles such as audit, medication review, prescribing and running disease specific clinics (General Pharmaceutical Council, 2019b). A growing number of pharmacists are developing to become independent prescribers and roles are emerging in care homes, allied services (such as the ambulance service) and emergency departments (General Pharmaceutical Council, 2019a, General Pharmaceutical Council, 2019b, Greenwood et al., 2019). The NHS plans to make the pharmacist an integral part of the general practice team (alongside other healthcare professionals) showing its commitment to further increase the role and utilisation of skills of the profession (NHS England & British Medical Association, 2019, NHS, 2019b). This expansion of roles amongst the pharmacy profession has led to many professionals choosing to work across multiple areas or sectors aiding multidisciplinary working and understanding (Weiss et al., 2018, Suzuki. M et al., 2017). This evolution of role is still occurring, and most pharmacists still work either in community or hospital pharmacies.

1.6 Community pharmacies and their services

Community pharmacies all offer essential services (see Table 2.1) (PSNC, 2019). These are standard supply and advice services which have always been available from local community pharmacies. Advanced services are also available in some locations (see Table 2.1) (PSNC, 2019). These are usually dependent on the training of the pharmacist and the facilities of the pharmacy.

Table 1. 5 Essential and advanced services available from community pharmacies (PSNC, 2019)**.**

Essential Services	Advanced Services
• Dispensing medicines • Dispensing appliances • Repeat dispensing • Clinical governance • Promotion of healthy lifestyles • Disposal of unwanted medicines • Signposting • Support for self-care	• Medicines Use Reviews • New Medicines Service • Flu vaccination • Appliance Use Reviews • Stoma Appliance Customisation • NHS Urgent Medicine Supply Advance Service

The two most common advanced services are the Medicine Use Review (MUR) and the New Medicine Service (NMS), these are summarised in Table 2.2. Based on recent figures, a median of 87% of community pharmacies provide MUR services and 66% provide the NMS (National Health Service Business Services Authority, 2019). Some pharmacies also offer locally commissioned services (sometimes known as enhanced services). These services are highly variable and can include smoking cessation, alcohol misuse, diabetes care and weight management services (PSNC, 2019).

Table 1. 6 An overview of MUR and NMS services

Criteria	Medicine Use Review (MUR)	New Medicine Service (NMS)
Which patients are these for?	70% of consultations must be targeted towards specified patient groups: 1. Those taking pre-defined high risk medicines which may cause side effects (non-steroidal anti-inflammatory drugs, diuretics and anticoagulant medicines). 2. Patient who have been discharged from hospital within the previous 8 weeks with a change to their medicines. 3. Patients with respiratory conditions such as asthma or chronic obstructive pulmonary disease. 4. Patients with cardiovascular disease or those at high risk of developing it and taking four or more medicines. The remaining 30% may be carried out with any other patient (Pharmaceutical Services Negotiating Committee, 2017a).	Patients prescribed new medicines for specified long-term conditions: 1. Asthma and chronic obstructive pulmonary disease. 2. Type 2 diabetes. 3. Antiplatelet or anticoagulant therapy. 4. Hypertension (Pharmaceutical Services Negotiating Committee, 2017b).
Purpose of service	• Assess patient’s use, understanding and compliance with their medicines.	• Help patients self-manage medicines for long-term conditions.

	• Identify side-effects and adverse drug reactions. • Resolve poor or ineffective medicines use (Pharmaceutical Services Negotiating Committee, 2017a)	• Improve adherence to medicines and improve patient knowledge. • Link newly prescribed medicines to healthy lifestyle advice (PSNC, 2019).
Method of delivery	The patient is given one face-to-face consultation, usually in the consultation room of the community pharmacy. Telephone MURs are possible although individual permissions need to be sought so these are rarely carried out (Pharmaceutical Services Negotiating Committee, 2017a).	The patient receives the new medicine with counselling and then is invited to receive the NMS. They are given two further consultations either face-to-face or by telephone (PSNC, 2019).

The aim of the MUR consultation (initiated in 2005) is to improve patients' understanding of their medication whilst increasing adherence; with an associated reduction in waste and side-effects (Pharmaceutical Services Negotiating Committee, 2017a). The service has undergone several specification changes and now 70% of MURs must be carried out with patients prescribed one from a pre-defined list of high-risk medicines, those with respiratory or cardiovascular disease or those recently discharged from hospital. The remainder of the MURs may be carried out with any patient who requests a consultation or where the pharmacist sees potential patient benefit. Implementation of MURs into practice was hampered by issues around patient-centredness and ensuring patients who would benefit the most were targeted, however this was addressed by an alteration in format and focusing on certain patient groups (Latif, 2017). Although formal evaluation has never been carried out, medication reviews have led to more appropriate choices of medication for patients, a reduction in polypharmacy (prescribing of multiple medicines for a patient) and improvements in patient knowledge and adherence (Blenkinsopp et al., 2012). Increasingly, studies show that certain groups of patients (such as those from ethnic minorities and patients with mental illness) do not receive MUR services and work is being carried out to address these inequalities (Latif et al., 2016a). There is uncertainty as to the future of community pharmacy services and it remains to be seen whether the government will continue to invest in pharmacy services in the years to come (Department of Health and Social Care, 2019, Pharmaceutical Services Negotiating Committee, 2019a). In July 2019, the UK government announced a phasing out of community pharmacy-based MURs and replacement with a similar Structured Medication

Review to be provided by pharmacists based within a primary care environment (National Health Service England and National Health Service Improvement, 2019). The impact of this on hard-to-reach and vulnerable groups remains to be seen.

The NMS was introduced in 2011 as a way of helping patients manage long-term conditions. The aims of this service include increasing medicines adherence, reducing waste and hospital admissions and promoting self-management (Pharmaceutical Services Negotiating Committee, 2017b). Patients who are first prescribed one from a predetermined list of medicines for long-term conditions are given preliminary counselling from the pharmacist and then offered a series of two consultations which are usually (but not always) provided by telephone (Latif et al., 2016b). At the first consultation the patient is asked whether they have started taking their medicines and any associated problems they are having, followed by another consultation after approximately two weeks where similar questions are asked. Issues such as side-effects or problems with understanding and compliance are addressed at an early stage in the patients journey with the medicine, and the service has been shown to improve adherence by 10% (Department of Health, 2014). Evaluation found the NMS to be economically beneficial with increased health gain at a reduced overall cost although no difference was found in health status or medicines beliefs (Elliott et al., 2017, Elliott. RA et al., 2016).

Both the MUR and the NMS service could potentially be used to help patients with cancer pain. Educational interventions to improve patient knowledge such as these have been found to be beneficial for patients with cancer pain with small (but significant) improvements in symptoms found (Bennett et al., 2009b).

1.7 Summary

This chapter explored the healthcare landscape and showed that medicines support is needed for patients with advanced cancer pain living in the community. The concepts of medicines optimisation and person-centred care were explored but these have yet to be combined and explored for patients at the end of life. The professional of pharmacy and the services available in the community have been introduced.

Chapter 2 Literature Review

This chapter reviews the existing literature about community pharmacy medicines optimisation consultations for cancer pain. The landscape for this research study will also be explored in further depth leading to the identification of the research gap within which this study will be grounded. A supplementary literature review is included in Appendix 2 (paper 2) of this thesis.

2.1 Pain at the end of life

Approximately 70% of patients with cancer experience pain towards the end of their life (Van den Beuken-van Everdingen et al., 2007, Portenoy, 2011). There is increasing choice allowing patients to die in their own homes if they choose but symptom control in community settings is often worse than in-patient environments (Higginson and Sen-Gupta, 2000, Office for National Statistics, 2015). A recent survey of bereaved people found that only 18% of patients in community settings had pain that was completely controlled at the end of life, compared with 38% in hospital and 63% in hospice settings (Office for National Statistics, 2015).

Cancer pain at the end of life is usually controlled using the World Health Organization (WHO) pain ladder where simple pain medicines move up the ladder to stronger more complex regimens in a stepwise manner with increasing pain (WHO, 1986). Although there is some disagreement about how mild-to-moderate pain is managed it is universally accepted that the standard treatment for severe pain at the end of life is strong opioid medicines (usually based around morphine and its derivatives) (Fallon et al., 2018, World Health

Organisation, 2017). However, only 48% of patients who die from cancer receive strong opioids and this is often only within weeks of death (Ziegler et al., 2016). Strong pain medicines need to be titrated to the lowest possible dose that efficiently controls symptoms whilst managing dose-related side effects. Achieving this balance is challenging for patients and healthcare professionals in a potentially rapidly changing condition such as advanced cancer (Hackett et al., 2016, Fallon et al., 2018). Patients who lack support at this time of need may experience lack of symptom control.

Patients with pain from advanced cancer are different from those with other chronic health conditions or other sources of pain. Advanced cancer is not something that the patient may be able to influence through improvements in their diet as in conditions like diabetes and hypertension. Their treatment is not intended to prolong their life as in other conditions but to make the time they have left as comfortable as possible (Bennett et al., 2016).

Patients with advanced cancer may have different emotions about their pain compared with other patient groups. They have a condition which will lead to them dying in the near future, in contrast to a chronic condition such as heart disease, that often people live with for years. They may feel their pain will only intensify as their disease progresses and that it could be a sign of irreversible decline. The rapid deterioration in symptom control seen in advanced cancer could be a frightening prospect for the patient experiencing it (Hackett et al., 2016).

Often patients need to balance controlling their pain with the side effects of the medicines used to control it. Patients may experience weakness, fatigue and breathlessness towards the end of life so making access to healthcare more difficult. The NHS long term plan calls for services to be personalised to the individual needs of the patients with other bodies recommending that access to care for dying patients should be fair and responsive (NHS, 2019b, National Palliative and End of Life Care Partnership, 2015, The National Council for Palliative Care & VOICES, 2015).

2.2 What services can community pharmacies offer for patients with cancer pain?

Patients with cancer pain can currently access essential services (such as dispensing and advice) but little else. This patient group rarely accesses either of the two main community pharmacy advanced medicines optimisation services partially due to individual service specifications not including this patient group (Savage et al., 2013). A small number of locally commissioned community pharmacy services involve patients with cancer although these either focus on access to palliative care medicines or screening and early referral services (Pharmaceutical Services Negotiating Committee, 2019b).

2.2.1 Barriers to access

Whilst community pharmacists are readily accessible for patients with cancer and their carers, research has shown several barriers to patients with cancer pain receiving community pharmacy services. These are discussed below.

A) Communication

The MUR is mostly targeted towards patients with specific medical conditions (not including cancer or pain). A small proportion can be provided for any other patient. Community pharmacies currently do not have full access to patient records, so they cannot identify patients who might have advanced cancer and may benefit from this service. Information is available from the Patient Medication Record (PMR) or dispensing history but that only has information regarding prescriptions that have been dispensed in that particular pharmacy. Part way through this study, in 2015, the Summary Care Record (SCR) was introduced for community pharmacists after relevant training and permissions had occurred and been granted (NHS Digital, 2017). This gives the community pharmacist a snapshot in time view of currently prescribed medicines. Information about previous medical history, current conditions, and history of prescribing is unavailable. MURs are usually opportunistic interventions where patients collecting medicines are offered the service (Latif et al., 2013b). A 2009 study found that, alongside community nurses, patients with cancer pain had more frequent contact with pharmacists than any other healthcare professional even though their diagnosis may not be evident to the pharmacist (Chatwin et al., 2009). However, patients with cancer may not visit the pharmacy in person and increasingly rely on delivery drivers or carers to pick up their medication therefore reducing the chance of being offered the service directly (Savage et al., 2013).

If the community pharmacist does not have access to details about a patient's medical condition, they have no reliable way of knowing that a patient has cancer unless they were to ask the patient and many feel uncomfortable doing this (Savage et al., 2013). Therefore, it is very rare that the community pharmacy is aware of a diagnosis of cancer pain until it is at an advanced stage where the patient is taking increasing doses of strong opioid medication and they piece information together to come to that conclusion (Savage et al., 2013). This lack of clarity of a patient’s medical history might prevent the community pharmacist identifying them as potentially being able to benefit from an intervention (Savage et al., 2013).

B) Service Specifications

The NMS may only be used for patients who are newly prescribed a medicine for asthma or chronic obstructive airways disease, type 2 diabetes, hypertension or anticoagulants (Pharmaceutical Services Negotiating Committee, 2017b). This is unlikely to occur in patients with cancer as it would be rare that a medicine in any of these groups would be newly prescribed for a patient with advanced cancer.

C) Service delivery

Patients nearing the end of life are often in rapidly changing states of health making any additional appointment difficult to attend (Hackett et al., 2016). Although it is possible for the MUR service to be provided by telephone, this is rarely done as permission needs to be sought from the NHS England on an individual patient basis for every consultation (Pharmaceutical Services Negotiating Committee, 2017a). In a busy community pharmacy, this additional administration is often in lieu of essential or advanced services (Latif et al., 2013a).

D) Knowledge and attitudes of pharmacists

Studies have shown that a number of knowledge and attitudinal barriers may prevent service delivery by community pharmacy for patients at the end of life. These include lack of confidence, knowledge and communication skills

(Savage et al., 2013, Hussainy et al., 2006, O'Connor et al., 2013). The roll-out of community pharmacy services that has happened since their introduction in 2005 has led to 87% of pharmacies now providing services so it would be expected that confidence in general service provision has increased since these studies were carried out (National Health Service Business Services Authority, 2019). Also, a large national chain of community pharmacies teamed up with the charity Macmillan in 2009 to provide an information service for patients with palliative needs with 2200 pharmacists nationally having completed the training to-date (Support, 2019). No formal evaluation has been carried out of this service although over 2000 community pharmacists had completed the training and 92,000 conversations had taken place between patients and community pharmacists up to August 2018 (Alliance, 2018). This means the number of pharmacists willing and able to provide advice to patients at the end of life is likely to have risen.

Studies where pharmacists have provided any sort of educational intervention for patients with cancer pain have all involved an element of training for those healthcare professionals taking part (Wang et al., 2013, Wang et al., 2015, Chen et al., 2014, Powers et al., 1983, Atayee et al., 2008, Jiwa et al., 2012, Needham et al., 2002, Hussainy et al., 2011). This ensures that pharmacists feel confident in their knowledge and skills before delivering interventions for this patient group.

2.3 Palliative Care

The concept of palliative care was pioneered by Dame Cicely Saunders who recognised the inadequacy of care for people who were dying during her role as an Almoner after the second world war in 1945 (Cicely Saunders International, 2019). She opened St. Christopher’s Hospice in London in 1967 and this was the first hospice to link pain and symptom control, compassionate care and research and teaching. A modern definition of palliative care (also known as supportive care) is:

> “treatment, care and support for people with a life-limiting illness, and their family and friends” (Marie Curie, 2019, p.1) (Marie Curie, 2019a)

Palliative care can be offered at any stage of an illness, often alongside other treatments. Palliative care includes end of life care, which is defined as:

> “treatment, care and support for people who are nearing the end of their life” (Marie Curie, 2019, p.1) (Marie Curie, 2019a)

This type of care is given to people who are thought to be within the last year of their life, although this timescale is often hard to predict. It aims to help people live as comfortably as possible and offers symptom and emotional support for patients and their families in all care settings (Marie Curie, 2019a).

Palliative care can be provided by any healthcare professional or therapist and can be delivered in any setting, including the patient’s own home. A recent study found that patients in their own homes who receive specialist palliative care experienced substantially better pain relief than those who do not receive this extra care (ElMokhallalati et al., 2019). This reinforces the case for providing community-based support services for patients at the end of life.

Hospices provide in-patient and outpatient palliative and end of-life care for people with life-limiting or terminal prognoses (Marie Curie, 2019b). They support physical, emotional, social and spiritual needs of the patient along with those of their friends and family. There is no time limit on this care and although patients may get admitted into the hospice towards the end of life, nursing, physiotherapy and some alternative treatment services can also be provided in patients' own homes (Hospice UK, 2019b). Hospices in the UK have complex funding arrangements, with the majority of funding coming from charities (Hospice UK, 2019a). Statutory sources of funding (which vary throughout the UK) are being frozen or reduced year-on-year increasing concern over the sustainability and service provision of hospices (Hospice UK, 2017, Groeneveld et al., 2017). Hospices are not NHS organisations, enabling them to have more autonomy and provide a unique range of services but also leading to variation in care. Ninety percent of hospice care is provided in community settings (rather than for inpatients) and this is via a combination of clinical staff and volunteers (Hospice UK, 2019b).

2.4 Palliative pathway

There are many studies focusing on place of death (e.g. home, hospital or hospice) but there is very little data about care settings in the time preceding death (Brogaard et al., 2013, Hakanson et al., 2015). In the month before death, although most patients have care only in one setting, 40% of patients in one study had a transition in setting or provider, and 6% of patients had five or more of these transitions (O'Leary et al., 2017, Lawson et al., 2006). Issues with pain and symptom control were associated with more transitions in the month before death (Lawson et al., 2006).

The patient journey through the care system is complex and not consistent (see Figure 2.1). Patients can travel through the system and care can be based in either the community (primary care), hospital (secondary care), or palliative care (tertiary care).

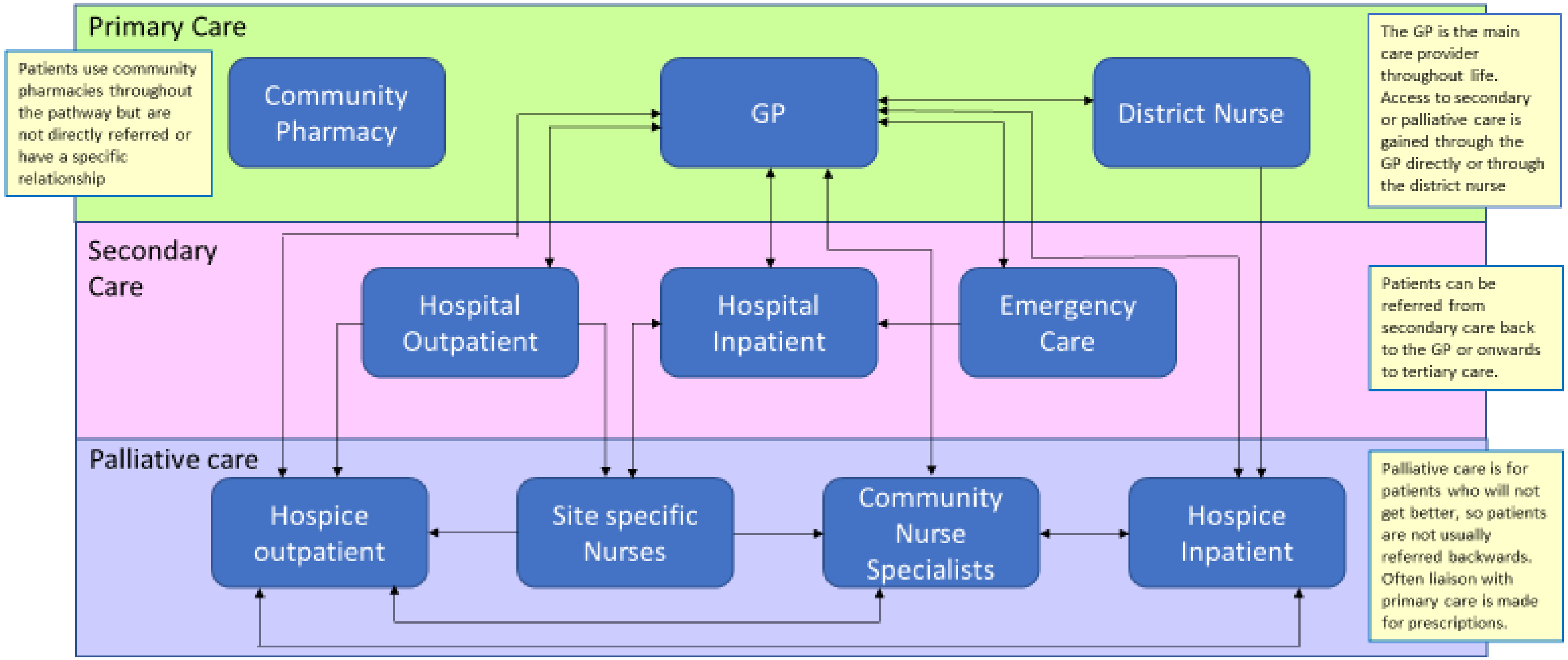
As shown in Figure 2.1, the main care provider throughout life for most people in the UK is their GP. Patients presenting to their GP with symptoms of cancer may be referred to a hospital-based consultant (as an inpatient or outpatient) or present at an emergency care facility. Care can be transferred back to the GP at any point although not usually from palliative care.

Once a diagnosis of cancer is made, the patient will either be an inpatient or an outpatient at the hospital. Treatment is usually given at the local hospital, but referral may also be made to specialist centres, depending on the site and stage of the cancer.

If curative treatment is not possible, patients may be discharged back into the care of the GP or may be referred to palliative care. The GP may also refer the patient to the district nurse if they need care at home. Any healthcare professional may refer a patient to palliative care, but differences occur locally in how this is done in practice (Guy's and St Thomas' NHS Foundation Trust, 2019, St Luke's Hospice, Mersey Care NHS Foundation Trust, 2019)).

Site specific cancer nurses work at local hospitals and often see patients before, during and after their diagnosis. Although they are palliative care nurses it is possible that patients have access to them without getting a palliative diagnosis.

Community pharmacists do not currently have a place in the palliative pathway. They may have regular contact with the patient through the dispensing of prescriptions from primary and secondary care but are not able to communicate with or transfer care to the rest of the healthcare team.



Patients use community pharmacies throughout the pathway but are not directly referred or have a specific relationship

The GP is the main care provider throughout life. Access to secondary or palliative care is gained through the GP directly or through the district nurse

Patients can be referred from secondary care back to the GP or onwards to tertiary care.

Palliative care is for patients who will not get better, so patients are not usually referred backwards. Often liaison with primary care is made for prescriptions.

Figure 2. 1 The pathway of a patient into palliative care (Author’s own).

The patient journey through the complex healthcare system is variable depending on their presentation, need or local provision or practice (Braithwaite, 2018).

Patients who die in a hospice or those who receive palliative care have better controlled symptoms at the end of life compared with those who die at home or in a hospital (Wright et al., 2010). The place of the GP in the pathway means they act as a gatekeeper into secondary and then palliative care. Multiple transitions between care providers can have a detrimental effect on patient health (Forster et al., 2005, Forster et al., 2003, Fylan et al., 2018). Mistakes at these transitions are common and can lead to patients not taking the medicines they were intended to take following discharge and experience associated harm related to this (National Institute for Health & Care Excellence (NICE) & National Patient Safety Agency, 2007, Garfield et al., 2009, Mixon et al., 2014).

2.5 Guidelines for the end of life

There is a growing wish for people to be allowed to die at home if they want to and numbers who do are increasing (Higginson and Sen-Gupta, 2000, National Health Service England, 2014). It is estimated that two thirds of people would like to die at home but only one third actually do (Gomes et al., 2012, Department of Health, 2008). This difference may be because patients change their minds in response to the symptoms or family wishes but because the healthcare system does not allow for adequate symptom management due to funding shortages or service provision (Beccaro et al., 2006, Hospice UK, 2017). The NHS Long-Term Plan and the Ambitions for End of Life Care call for increased support for self-management for patients and personalisation of care at the end of life and National Institute for Health and Care Excellence (NICE) guidelines describe an aspiration to improve the experience of patients in the last year of life (Office for National Statistics, 2015, NICE, 2017, NHS, 2019b, National Palliative and End of Life Care Partnership, 2015). It is evident that improvements in community care support can help with these goals and allow patients to remain in their own homes for as long as possible towards the end of life.

It is estimated that approximately 70-80% of patients can have their medication adjusted using the WHO pain ladder to provide adequate pain relief and it is likely that this occurs more routinely in care settings such as hospices where there is a large emphasis on symptom control and quality of life (World Health Organisation, 2017, Van den Beuken-van Everdingen et al., 2007).

One of the challenges of care at the end of life is the identification of those who need help, an issue recognised in NICE guidance:

> "People approaching the end of life are identified in a timely way" NICE 2019: Page 1 (NICE, 2017)

It is evident that the identification of those with palliative care needs towards the end of life is continuing to be a challenge as only 65% of patients ever receive specialist palliative care, with a median contact time of only 34 days when they do (Ziegler et al., 2018, Bennett et al., 2016). This is often biased against people that are poor, elderly, single, or where English is not their first language (Rosenwax and McNamara, 2006, Currow et al., 2008).

The National Cancer Research Institute (NCRI) partnered with the James Lind Alliance in 2018 and conducted surveys involving 3500 patients, carers and health and social care professionals with a view to identifying priorities to help people living with and beyond cancer (NCRI, 2018). Managing pain from cancer, co-ordinated care and management of side-effects are included in the top ten priorities for research, showing that these are important for patients and healthcare professionals alike (NCRI, 2018). Parameters such as these are difficult to measure and outcomes which are measured and used as proxies for good care at the end of life are often place of death (compared with preferred place of death) or whether paperwork is completed in a timely fashion.

2.6 Where could pharmacy services fit in for patients at the end of life?

There are strong advocates, including the British Medical Association (BMA) and the King’s Fund, for the extended role of community pharmacists to optimally manage patient medicines and support patients with pain at the end of life through the use of MURs and NMSs (BMA, 2017, NHS, 2016a, NHS, 2016b, The Kings Fund, 2017). Whilst there is no mention of pharmacists providing end of life services in recent UK cancer policy setting documents, there is a consensus for improving round-the-clock care for all patients (not just those with cancer) and tailoring that care to their needs (NHS, 2016a, NHS, 2016b). As part of the NHS Long Term Plan initiated in 2019, pharmacists will deliver medicines optimisation services within GP practices with the aim of improving the quality of prescribing, promoting self-care and reducing medicines wastage (NHS, 2019b). Pharmacist-delivered medicines optimisation services from GP practices could be a way of supporting patients with unmet needs at the end of life.

Pharmacist support can aid self-management through educational interventions to improve knowledge and understanding (Verret et al., 2012). This clearly supports the King's Fund priorities of active support for self-management, where the patient is part of any decision that might be made about their care and advocates equipping the patients with the tools to be able to manage their own symptoms (The Kings Fund, 2017).

2.7 Educational interventions for symptom management of cancer pain

Educational interventions are information given to the patient via the use of written materials, face-to-face consultations, by telephone or computer (or other device) and may be provided by any healthcare professional (Bennett et al., 2009b). Medicines optimisation consultations such as the MUR and NMS services are examples of these and have been shown to improve adherence to medicines, patient knowledge and prescribing (see pages 19-23) (Elliott et al., 2008, Blenkinsopp et al., 2012, Department of Health, 2014).

Research has shown that educational interventions can make a positive difference to levels of cancer pain (Bennett et al., 2009a). A systematic review of 21 trials containing over three thousand patients found that educational interventions led to a small improvements in pain levels for patients with cancer (Bennett et al., 2009b). The effects were due to improved knowledge of medicines and attitudes towards pain although the interventions were carried out by several different healthcare professional roles. Another systematic review by the same author explored the effect of educational interventions by pharmacists for chronic (non-cancer) pain (Bennett et al., 2011). A small reduction in average pain intensity and a reduction of 50% in adverse events was found but the review concluded that further evaluation was necessary.

Until this study, no review of experimental studies by pharmacists conducting services for cancer pain had ever been published. Several non-experimental studies have been carried out looking at educational interventions by community pharmacists for patients with cancer at the end of life (see Table 2.3) (Atayee et al., 2008, Jiwa et al., 2012, Hussainy et al., 2011, Needham et al., 2002). Two studies involved the provision of pharmacist medication reviews for patients and two involved integration of the pharmacist into the palliative care team.

Table 2. 1 A summary of non-experimental studies involving community pharmacists providing educational interventions for palliative care patients

Author and title	Year	Country	Intervention	Findings
Atayee (Atayee et al., 2008) **Development of an Ambulatory Palliative Care Pharmacist Practice**	2008	America	To establish a model for incorporating an outpatient clinical pharmacist as part of the multidisciplinary team	• Most common referral reason – pain (93%) • 98% of recommendations accepted by oncologist
Jiwa (Jiwa et al., 2012) **Field testing a protocol to facilitate the involvement of pharmacists in community based palliative care**	2012	Australia	Pilot a model of care that supports the role of a pharmacist in a community palliative care team	• 113 drug related problems found from 52 home medication reviews • 120 recommendations made. • Participants felt pharmacist contributions were beneficial.
Hussainy (Hussainy et al., 2011) **Piloting the role of a pharmacist in a community palliative care**	2011	Australia	Medication review of palliative care patients by an accredited pharmacist	• 145 recommendations were made

multidisciplinary team: an Australian experience				• 93% doctors positive about recommendations • 83% patients positive about intervention
Needham (Needham et al., 2002) **Evaluation of the effectiveness of UK community pharmacists' interventions in community palliative care.**	2002	UK	Effectiveness of community pharmacists' clinical interventions for palliative care patients assessed by multidisciplinary panel review.	• 130 interventions • 81% judged by expert panel to be beneficial, 3% detrimental

2.8 Identification of research gap

The literature indicates that there is a need for extra support for patients with advanced cancer pain and an appetite from government that more support should be provided. This would enable patients to manage their own conditions and stay in their own homes wherever possible. Educational interventions for patients with advanced cancer pain can be effective but there is a paucity of evidence which demonstrates their efficacy when provided by pharmacists. The extended roles and competency of pharmacists indicates that pharmacists are in a good position to offer such support. However, issues such as a complex patient pathway, limited communication, lack of skills and issues with service delivery may prove to be challenging obstacles to successfully delivering new support mechanisms and services to patients with advanced cancer pain.

2.9 Research problem and research questions

Person-centred medicines optimisation services are currently not provided for patients with advanced cancer pain. So the research question for this study is:

Can community pharmacists positively contribute to the end of life care of patients with advanced cancer pain?

A positive contribution by community pharmacists would be to perform medicines optimisation to ensure patients get the most possible benefit from the medicines they have been prescribed and to help them manage their condition.

This can then be sub-divided into the following questions which are addressed in each of the studies.

Study 1 How do patients with advanced cancer pain perceive a community pharmacist delivered medicines optimisation service?

Study 2 What do we already know about community pharmacy services for patients with advanced cancer pain?

Study 3 Is a pharmacist delivered medicines optimisation consultation feasible and acceptable for patients and healthcare professionals?

2.10 Summary

The aim of this chapter was to review the literature in the area of pharmacy services and end of life care. This has shown that pain is a problem at the end of life and that community pharmacies already offer services to help support symptom management, however barriers exist in their use in a population with cancer pain. National policy calls for improved symptom support for patients and an improved use of pharmacist skills. The research gap was thus identified along with the research question.

The next chapter will present the research methods used in the research and the methodology adopted. A critical reflection of these methods will also be laid out.

Chapter 3 Methodology and methods

This chapter outlines the research methods, methodological approach and data collection techniques adopted in this study. It will also present the research process and analytical techniques employed.

3.1 Research process

The studies were undertaken over a period of five years and the papers were written in close succession. The studies were all part of a National Institute of Clinical Research (NIHR) programme grant entitled Improving the Management of Pain from Advanced Cancer in the Community (IMPACCT) although one was written whilst the author received Research Capability Funding from the local National Health Service CCG.

3.2 Methodological Approach

Several different theoretical perspectives exist and were considered to answer the research question (see Table 3.1). These are shown below. The one deemed most appropriate and which was adopted was pragmatism.

Table 3. 1 A summary of research methodologies considered within this study (Creswell, 2011, Austin. Z & Sutton. J, 2018, Saunders, 2003).

	Positivism	Constructivism	Pragmatism
Ontology	Singular quantifiable reality.	Multiple realities – people's thoughts and feelings.	Singular and multiple realities – provide multiple perspectives.
Epistemology	Impartial, the researcher is independent of the research.	Researcher part of the research process.	Practical – "what works" to address research question.
Methodology	Deductive.	Inductive.	A combination of deductive and inductive approaches.

The aim of this study was to answer the research question and in order to do this, dedicated and individual approaches were necessary rather than a single methodology. A pragmatic approach was adopted in order to explore multiple perspectives, using different approaches. Practical methods were chosen in response to the research question and the complex environment in which the research was set (Creswell, 2011, Feilzer, 2010, Tashakkori, 2010). Furthermore, each method used was best suited to its own particular part of the research and its aims, and when these parts were brought together, they gave a more comprehensive view of the research problem than if one particular ontology had been applied (Mason, 2006). For example the qualitative interviews allowed the experiences of patients to be explored, the systematic review examined literature from previous studies, and the proof-of-concept study facilitated the practical testing and evaluation of a new intervention (Tashakkori, 2010). The multiple approaches used allowed the problem to be explored from different perspectives which can lead to a greater accuracy and robustness in responding to the research question (compared with using only qualitative or quantitative methods (Tashakkori, 2010, Feilzer, 2010). Pragmatism allowed the research to not be constrained by a particular ontology but be flexible and find the best way of answering the research question that was most useful for the overall study and likely to produce actionable insight (Feilzer, 2010). If only qualitative methods had been used, the evidence gathered from the systematic review would not have been found. If only quantitative methods had been used, a service may have been designed for patients without any idea whether it was something that was needed or wanted. If elements of both are employed, broader, more in-depth results are found which answer the research question using the most practical and appropriate method (Creswell, 2011, Feilzer, 2010). Figure 3.1 shows a summary of methodology, positioning and strategy.

Figure 3. 1 A summary of methodology, positioning and strategy

Epistemological position

- Pragmatism : The most appropriate method was chosen in response to the research question and setting
- Multiple perpectives were gained leading to a more robust answer to the research question

Research strategy

- Inductive and deductive
- Generation of new knowledge from the data alongside testing the theory

Mixed methods approach

- Study 1: Semi-structured interviews explored the views and experiences of patients with advanced cancer pain
- Study 2: Systematic review and meta-analysis of other studies in this area
- Study 3: An educational intervention was tested and its acceptability and feasibility was assessed.

Data collected

- Study 1: Qualitative
- Study 2: Quantitative and qualitative
- Study 3: Qualitative and quantitative

Analysis

- Study 1: Thematic framework analysis
- Study 2: Systematic review and meta-anlysis and narrative synthesis
- Study 3: Descriptive statistics, quantitative analysis of patient surveys, qualitative analysis of consultation content, data synthesis of feedback from community pharmacists.

An iterative design approach was adopted throughout the project and initial ideas and thoughts for the consultation design and delivery were adapted in response to the qualitative interview findings. For example, an internet-based remote consultation was one of the original methods of delivery considered for Study 3 however this was found to be unacceptable for this patient group in the interviews in Study 1. Methods in Study 3 were developed iteratively in response to what worked in practice. When the original method of recruitment was found to be ineffective, the method was changed and re-evaluated. This was done iteratively until an effective and practical method was found. Although analysis methods were mostly qualitative, quantitative analysis was carried out in Study 2 (systematic review and meta-analysis) and in Study 3 a qualitative stance was adopted within reviewing the number of Medicines Related Problems (MRPs) of each type and acceptability data (Pharmaceutical Care Network Europe Foundation (PCNE), 2017).

Other epistemological positions are of course valid, however, this is a complex and multifaceted research study which required the most appropriate and practical research method for each part to ensure robust investigation of the research question (Creswell, 2011).

3.3 Research design

The research question required a mixed-methods approach with each consitituent part requiring the most appropriate method (Creswell, 2011). Framework analysis is a type of thematic analysis and was chosen to analyse interviews in Study 1 as it allows analysis across participants leading to the development of meaningful themes while still allowing the context of each individual taking part (Gale, 2013). A matrix is used to allow the researcher to look at the information by case and also by description (or code). It provides a more systematic method compared with thematic analysis and allows themes to be identified but also allows comparison across cases which makes analysis versatile. The method also does not align to either inductive or deductive analysis and purely depends on the research question (Gale, 2013) The systematic approach of framework analysis allowed a series of steps to be followed whilst managing the data and this was chosen for transparency and ease of information processing. Emergent methods were used for the recruitment of participants to Study 3 iteratively in response to findings (Creswell, 2011). This decision was taken to ensure the research question was answered and also resulted in Paper 3 which produces recommendations useful for future research in this area.

3.4 Intervention development

There were three key inputs into the intervention development and these are discussed in this section.

1. Qualitative data from Study 1 was analysed from the perspective of what would be beneficial for participants to support them in managing their medicines.
2. A literature review was performed to identify previous medicines optimisation studies involving community pharmacists managing cancer pain (see Table 2.1 page 37). It was identified at this stage that there was a gap in the literature and no systematic review had ever been carried out in this area. The papers identified in the literature review showed a number of educational interventions had been tested in community pharmacy and these all involved a type of medication review, an educational element for participating pharmacists and varying methods (Blenkinsopp et al., 2012, Atayee et al., 2008, Jiwa et al., 2012, Hussainy et al., 2011, Needham et al., 2002).

3. A multi-stakeholder workshop was then held with patients, pharmacists, commissioners, other healthcare professionals and academics during which the components of the proposed intervention were discussed. The findings from Study 1 and the literature review were presented to participants.

Multi-stakeholder workshop participants were asked three questions:

1. What questions need to be asked as part of a pharmacist cancer pain medicines consultation?
2. What specific problems may arise in relation to strong opioids?
3. What other cancer related issues may be brought up, and how could these be dealt with?

The responses were mapped onto the suggested questions for current community pharmacy medicines consultations (Pharmaceutical Services Negotiating Committee (2017a).In a group discussion the workshop participants decided that all necessary information could be collected and delivered in the form of either the MUR or the NMS and it was not necessary for a new service to be developed. The MUR would allow consultations to be delivered in the patient’s local community pharmacy or over the telephone with appropriate permissions. Additionally, no restrictions were present in the service specification with what needed to be prescribed, meaning this could be provided by community pharmacists as a funded MUR consultation (Pharmaceutical Services Negotiating Committee (2017a).

When it became clear from quantitative data in Study 3 that recruitment within the service specification of the MUR was not possible, the intervention was changed to be delivered in the NMS-style. The NMS service is based around the same questions as the MUR so patient needs would still be met Pharmaceutical Services Negotiating Committee (2017b). The intervention could not be paid for as NMS as it did not fulfil the requirements of certain specific medicines being prescribed. The change to an NMS-style intervention did allow the intervention to be delivered by telephone by a centralised Research Pharmacist (RP).

3.5 Sample

The target population for this study was patients with advanced cancer pain (see Table 3.2 below). Exclusion criteria were participants not fitting the inclusion criteria. Purposive sampling was used in study 1 and study 3 as it would not be possible to ask any other population how patients with cancer pain experience pharmacy services or test the intervention in another group as they would not have had the specific views and experiences of this patient group.

Table 3. 2 The inclusion criteria for the study

Inclusion Criteria

1. Aged over 16 years old
2. Have advanced cancer*, are aware of their diagnosis and experiencing pain.
3. Been given a prescription for opioids**
4. Have not been prescribed anticipatory medicines*** and are therefore not in the last days of life.

5. Have the capacity to provide informed consent and complete questionnaires before and after the consultation.

* **Patients with advanced cancer** are defined as those with metastatic cancer with histological, cytological or radiological evidence AND/OR those receiving anti-cancer therapy with palliative intent.

** **Opioids** are codeine, codeine and paracetamol, codeine and ibuprofen, dihydrocodeine, paracetamol and hydrocodeine, tramadol, tapentadol, morphine, fentanyl, buprenorphine, diamorphine, hydromorphone, methadone and oxycodone.

*****Anticipatory medicines** are medicines which are often used to control symptoms in the last days of life. These are usually prescribed in a package as this time approaches.

Due to the nature of the advanced disease in this patient group, recruitment was challenging because of ethical, identification, gatekeeping, retention and feedback factors. Study 3 identified the major learnings from the recruitment process and what similar studies could do to mitigate these issues in the future (Edwards et al., 2019a). The population of patients with advanced cancer are often difficult to recruit into research studies and levels of attrition and loss to follow-up are usually high (Hui et al., 2013). Sample size calculations were not necessary for any study as efficacy was not being tested although each study required an appropriate sample size to suit its purpose (see Table 3.3).

Table 3. 3 The target sample size for each study

Study	Sample size requirement
1. Interview Study	• Adequate to explore views and experiences and to achieve data saturation. Aim:15.
2. Systematic Review	• Did not require a sample size.
3. Proof of concept study	• Required enough participants to assess the retention, and deliverability of the intervention as well as the acceptability and feasibility. Aim: 25.

Participant numbers were sufficient to demonstrate qualitative views of patients and that the proof-of-concept respectively (Fusch and Lawrence, 2015, Malterud et al., 2016, Austin, 1983).

3.6 Data collection tools

A range of data collection tools were used in this study. These were appropriate to the individual foci and each are presented here.

Study 1 comprised semi-structured interviews. An interview schedule was developed that addressed aims of the interviews and it was piloted with our Patient and Public Involvement (PPI) group (see Appendix 10).

Study 2 was carried out using electronic database searches after which data was transferred into a Word document.

Study 3 used pre- and post-intervention questionnaires for patients, pharmacists and other healthcare professionals involved. These were informed by the aims of the study and piloted with two members PPI members, a pharmacist not involved in the study and a GP not involved in the study. NHS England were consulted about the data we could collect from the consultations taking into account data protection guidelines. The resulting data collection form was piloted by a pharmacist before use. A questionnaire was also developed to obtain feedback from community pharmacists the day after they carried out the consultation. This was developed after the study had started, in response to a need for feedback and a minor ethical amendment was obtained for its use.

3.7 Critical reflection of methods adopted

As detailed on pages 42-43 pragmatic methods were used. Study 1 aimed to explore the views of patients with advanced cancer pain on community pharmacy and its services. Qualitative, semi-structured interviews were deemed the most appropriate data collection tool to explore patient views (2013, Bowling, 1997). Questionnaires could have been used to obtain data for this study but would not have provided the insight into the specific views and experiences of the patient group and would not have allowed exploration of the issues (Bowling, 1997). Focus groups of patients who were experiencing cancer pain would have been difficult to organise and may have put undue stress on participants (Bowling, 1997). The resulting paper following semi-structured, qualitative interviews, contains in-depth patient views which describe the needs of patients in this group and allow development of a service based on their experience.

Study 2 required a thorough examination of previous published research and this could only be done using a systematic review. A narrative review could have resulted in a greater variety of studies (e.g. non-experimental design) to obtain more breadth but this would not have allowed for the rigorous methodological analysis of quality which was used or the meta-analysis of the pain levels.

The aim of Study 3 was to explore the feasibility and acceptability of educational interventions for patients with cancer pain. Methods were iteratively developed and adapted in response to the problems encountered. Initial methods used family doctor computer searches to identify patients. This was time consuming and resulted in many patients who used pharmacies which were not part of the study. More pharmacists could have been trained in response to these findings, but this would have led to variations and delays in training before delivering an intervention for patients who often have rapidly progressing illness (Hackett et al., 2016). All methods used were slow to recruit patients except personal recruitment in the hospice. We were unable to maintain slow recruitment rates due to funding constraints and new methods needed to be found to deliver that part of the programme grant. Initially, we had planned that community pharmacists were to deliver these interventions, and this could be done in-person or by telephone. Community pharmacists found these interventions difficult to complete when they were providing them infrequently. Due to this, and the problems with recruitment, methods were adapted to allow a centralised provision of service based on an NMS-style service. This didn’t have the constraints of the MUR-type service and allowed it to be provided to a broader geographical spread of patients. If the community pharmacy MUR-based intervention method had continued, it would have allowed further exploration of this service, however, the aim was to provide a medicines optimisation service to patients and this may not have been possible in the time period available.

3.8 Data Analysis

Data were collected via multiple methods and a range of analytical techniques were also utilised. These are captured in Table 3.4.

Table 3. 4 The data analysis methods used for each study

Study number	Method of data analysis used
1	Qualitative data from patient interviews were analysed using the framework analysis technique (Ritchie, 2003). A framework was devised from the interview topic guide and amended using the data generated. Themes were generated from the data produced.
2	Systematic review data were analysed qualitatively for outcomes that were heterogenous and quantitatively using RevMan [Computer program] (Version 5.3. Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration, 2014) for the meta-analysis. Quality was assessed using the Cochrane tool for assessing bias which was found to be useful when thinking about the design and reporting of future studies (Higgins et al., 2011).
3	The aim of the Study 3 was to evaluate the consultations and to assess their feasibility and acceptability. Data analysis was carried out on the content of the consultations using the Pharmaceutical Care Network Europe (PCNE) classification system (Pharmaceutical Care Network Europe Foundation (PCNE), 2017). The feasibility and acceptability were assessed using analysis of qualitative data from questionnaires and feedback to the research team via the follow-up phone call after the consultation. Iterative recruitment methods were compared using recruitment rates.

3.9 Ethical considerations

Research with patients approaching the end of life presents ethical considerations although no special guidelines are in place other than close scrutiny by ethical committees (Phipps, 2002). From the development of the programme grant through to development of the methods and tools, patients (in the form of PPI) were involved at every stage as can be seen in Table 3.5.

Table 3. 5 Patient involvement for each study

Study	Patient involvement
1. Semi-structured interviews	• Patients were part of design process with regular update meetings allowing feedback. • Interviews piloted with two PPI patients and feedback actioned and repiloted. • Participant information sheets and consent forms piloted with PPI.
2. Systematic Review and meta-analysis	• Patients not needed in design although aware through regular meetings.
3. Proof-of-concept study	• Participant information sheets and consent forms piloted with PPI. • Structure for consultation adapted from MUR and NMS structure already used with patients. • Adapted structure piloted with PPI patient. • Pre and post-consultation questionnaires piloted with PPI patients.

Regular team meetings were held where our PPI group could comment on the study and extra communication (in person, by phone or by email) was used as necessary. All patient-facing material was piloted or checked with our PPI group and two-way communication allowed changes to be made whilst still fulfilling the aims of the study.

Ethical review for all patient-facing studies was applied for and favourable opinion was obtained from both the University of Bradford and the Leeds West NHS Ethical Committee. The iterative methods required for the studies required many amendments to the original ethics application, both minor and substantial. This added to the time needed to complete the studies. Research and development permission was also requested from both the hospice and hospital where recruitment took place.

Specific ethical considerations for this patient group were as follows:

3.9.1 Patient burden

All studies were designed to keep the burden on the patient to a minimum. Special permission was obtained from NHS England to create a pathway to enable patients in Study 3 to receive the initial MUR design over the telephone and each pharmacy was provided with a secure NHS email address (before the national roll-out) to enable this to happen. Consultations were kept short and patients were able to decline or delay the consultation as they needed.

The burden on patients (reported on in Study 1 and 3) was carefully considered during the planning and conduct of the research. Permissions were sought from the lead healthcare professionals involved in patient care before recruitment, and appropriate referral was made where necessary by the healthcare professionals carrying out the consultations. On one occasion, a participant in the interview study needed referral back to their lead healthcare professional due to concerns over their mental health and levels of pain.

3.9.2 Access to usual care

Patients were informed in the participant information sheet and also at each contact that should they have any questions or problems with their symptoms or treatment that they should contact their normal healthcare professional. It was made clear (in the participant information sheets and the consultations themselves) that the intervention did not replace any usual care but was being given in addition. GPs were notified of their patient’s involvement and given the contact details for the research team for any queries.

3.9.3 Confidentiality

Interview data was confidential and anonymised and transcribed in-house allowing no third-party access. Extra consideration was given in the development of Paper 1 and Paper 3 to ensure no patient was identifiable, even by those close to them. Interview transcripts will be kept for 5 years and then destroyed.

All pharmacists conducting the consultations were registered and had undertaken the necessary training. Consultations were all conducted in confidential environments where conversations could not be overheard and SCR access was done on registered pharmacy premises.

3.10 Reliability, Transferability and Validity

The concepts of reliability, transferability and validity are considered in research to ensure the highest quality research has been conducted with reliable results which could be transferred to a different environment (Creswell, 2011).

3.10.1 Reliability

Reliability is whether the study could be replicated and consistent results obtained and although not appropriate for all parts of the study, the rigour of the analytical methods and tools used would lead to consistent findings if repeated (Bowling, 1997).

Study 1 used qualitative interviews and direct patient quotes to develop themes and meaning. The interviews were transcribed verbatim, and transcripts were discussed with two senior colleagues on the research team and then amongst researchers in the University of Bradford Medicines Optimisation Research Group (MORG) to limit bias and aid analysis.

Study 2 was a systematic review and meta-analysis and co-authors included a statistician and a senior academic with extensive experience of such studies. Searching was aided by an experienced librarian using Medical Subject Headings (MESH) terms and then data were extracted by two people independently. Meta-analysis was carried out by a statistician using appropriate software.

Study 3 was the proof-of-concept study assessing acceptability and feasibility of the intervention. Both patients and healthcare professionals were invited to feedback on the intervention process and resulting learnings were reported.

Both quantitative data and qualitative case studies were reported which triangulate results and the potential for this intervention in the future. Methods were described transparently and a series of recommendations, based on the process were then made.

Reflexivity was exercised throughout and mechanisms were put in place to keep bias to a minimum. This was a particular risk when the RP was carrying out the consultations as they would also be responsible for analysis so could influence the results. A questioning grid was designed (based upon current MUR and NMS service specifications) to guide the consultations and ensure all essential areas of the consultation were adhered to and that this was recorded as it happened. This reduced any bias as information was recorded at the time and was not open to interpretation later. Other researchers from the programme grant and Medicines Optimisation Research Group (MORG) were involved in interpretation of findings for Study 1 and 2 and the wider IMPACCT research team were consulted to aid interpretation. As the RP was conducting 'insider research' the balance between academic and clinical knowledge or skills was useful however it is important to acknowledge and understand the risk of bias in this type of research (Fleming, 2018).

3.10.2 Transferability

The transferability of the research refers to whether the findings could be transferable to other settings (Tobin, 2004, Bitsch, 2005).

In Study 1 the qualitative views of patients with cancer pain describe the experiences of patients in one area of the country. It is unlikely that these experiences would differ very much by area although some areas may have different services for this patient group making their experience slightly different.

Transferability is not applicable for the systematic review in Study 2 as it explored evidence of educational interventions from the whole world from the inception of the databases to the present day. The results were however interesting to understand service provision elsewhere.

Study 3 provides data from multiple sources on the acceptability and feasibility of the intervention study. This was only carried out in one area of the UK, so the experiences of patients may differ according to the area in which they live and the services which are provided. The findings found that a significant number of MRPs were found in a population, the majority of whom were already receiving specialist palliative care. It is likely that if we were able to repeat the intervention with the proportion of patients who were not in receipt of this, then even more MRPs would be found. Further research needs to be carried out to confirm this. Although limitations were found, the findings could also be transferred to other disease states where a telephone-based medicines consultation may be of benefit to the patient.

3.10.3 Validity

Validity of research identifies whether the research measures what it was intended to measure and whether the results are likely to be accurate (Creswell, 2011). Internal validity is an assessment of the methods and whether the most appropriate methods were used and the research was carried out following those (Patino and Ferreira, 2018). Methods were appropriate and adhered to making this study have internal validity. External validity refers to whether the results of the study can be applied outside our study setting (Patino and Ferreira, 2018). The proof-of-concept study had broad inclusion criteria which increases the external validity however a future trial would improve this further. It is not clear whether patients from different healthcare economies would have a similar level of knowledge and need as the patients in this study but this could be assessed in future studies. This research aimed to assess whether community pharmacists could positively contribute to end of life care of patients with advanced cancer pain and have shown that they can, with some caveats (see pages 64-69). The validity of this research as a whole, is strengthened, as each of the component parts helps support the others with data being presented from multiple perspectives in accordance with its pragmatic methods (Creswell, 2011). When this is combined with the literature, both that found in Study 2 and in this thesis, it provides a compelling case for the intervention.

3.11 Summary

This section has detailed and justified the mixed-methods, pragmatic approach of this research. It has explained why each method was chosen, how data was collected and analysed and how this all fits together to form a coherent answer to the research question. The next chapter will present the results.

Chapter 4 Results

The aim of this study was to find out whether pharmacists can positively contribute to end of life care for patients with advanced cancer pain. Three key areas are presented in the results:

1. How do patients with advanced cancer pain view community pharmacy and its services?
2. What do we already know about community pharmacy services for patients with advanced cancer pain?
3. Is a pharmacist delivered medicines optimisation consultation feasible and acceptable for patients and healthcare professionals?

Each key area is presented and elaborated on in the body of this chapter.

4.1 How do patients with advanced cancer pain perceive a community pharmacist delivered medicines optimisation service?

The focus of this part of the research was to explore the views and experiences of patients with advanced cancer pain about community pharmacy and its services and how they manage their medicines and symptoms (see Appendix 1 – Paper 1).

Qualitative semi-structured patient interviews were conducted with patients with advanced cancer, some who were receiving specialist palliative care (n=7) and some who were not (n=6). Patients involved were aged between 40-89 years with 10 male and 3 female participants. Data were analysed using framework analysis (Ritchie, 2003). Four themes and ten sub-themes were identified (see Figure 4.1).

Figure 4. 1 Summary of the themes and sub-themes found in qualitative interviews with patients suffering from advanced cancer exploring the use of pharmacies and their services.

4.1.1 Pain management

Adequacy of pain control was raised and patients not receiving specialist palliative care described being in pain more than those who were receiving specialist services. Of the patients who were not receiving specialist care, 5 out of 6 described experiencing uncontrolled pain, compared with no patients reporting uncontrolled pain in the group receiving specialist services. The results showed a need for support for patients not receiving specialist services to help them manage their symptoms and side-effects.

Medicines knowledge amongst patients varied considerably. Some patients voiced a need for extra support with their medicines and did not understand the basics of which medicines they took for pain. There were also patients who felt that they were not in control of their symptoms and medicines through their lack of knowledge. They described situations where they would *experiment* to see which they could “do without” and which they “needed” due to concerns over long-term use of medicines. This experimentation was undertaken without support as patients had often voiced fears to healthcare professionals that were subsequently dismissed.

4.1.2 Experiences and expectations

C*ommunity pharmacies* were chosen based on perceived friendliness, location and service and in some cases would be accepting of mistakes if they thought the staff were friendly.

When discussing healthcare professionals; patients perceived a *hierarchy* of healthcare professionals involved in their care, with specialist palliative care nurses at the top due to their familiarity with managing patients with palliative needs and their perceived accessibility to patients. As half of the patients did not have access to this specialist care, they identified their GP, family or pharmacist as the person they would go to for help.

Patients were open to the idea of pharmacist medicines *support* consultations and thought they would be especially useful for patients before they had access to specialist palliative care. Some patients described a rapidly changing medical situation and voiced a need for continued, rather than one-off, support.

4.1.3 Access to care

Patients described their problems accessing services and how they developed methods of *resilience* in response to problems, particularly with access to medicines. Patients found ways of making sure they had access to their medicines, usually after an event when they had come close to running out or gone without completely. One patient described a situation where they had been left, out-of-hours, with no medicines after a GP had prescribed pain-relief but there were no community pharmacies open to obtain the prescription. Luckily, the patient was a qualified nurse who was able to use a combination of the medication they had at home to go some way to controlling the pain until they were able to get the prescription the following day.

Patients liked the idea of a service that would be provided by telephone as it would allow them *alternative* access to support without the need to have to travel to an additional appointment.

4.1.4 Communication

Concern was expressed over *conflicting* advice given by multiple healthcare professionals if a further service were to be added into the pathway although this view was only expressed by someone already receiving specialist palliative care. *Patients* were surprised that medicines information was not shared with the pharmacy and expressed concern about the consequences of the lack of communication.

4.2 What do we already know about community pharmacy services for patients with advanced cancer pain?

This research comprised a systematic review and meta-analysis (see Appendix 2 – Paper 2). Only four experimental studies focusing on educational interventions by pharmacists for patients with cancer pain were found when searching records from inception to present day. These studies were carried out between 1983 and 2015, one was from the United Kingdom and three were from China and all were relevant as they carried out some form of medication review (Blenkinsopp et al., 2012). The quality of the studies was assessed using the Cochrane risk of bias and multiple flaws and risk of bias was found with many parameters either unclear or missing from the results (Higgins et al., 2011).

Meta-analysis was only possible on three of the four studies due to the heterogeneity of those included. Results indicated a positive change in pain intensity following pharmacist educational interventions for patients with cancer pain. Descriptive analysis found that interventions increased patient knowledge when measured (in two studies) and patient satisfaction (in two studies) however methods of assessment were assessed as unclear or poor using the Cochrane tool for quality assessment (Higgins et al., 2011). Although not comparable, side effects were measured in three studies and decreases were seen. Quality of life was found to increase in the two studies where this was measured.

4.3 Is a pharmacist delivered medicines optimisation consultation feasible and acceptable for patients and healthcare professionals?

This element was studied in depth in Study 3 (see Appendix 4 – Paper 4) but is revisited here. There were several different components of assessing feasibility and acceptability (see Table 4.1). Acceptability was split into three parts using a known theoretical framework (Sekhon et al., 2018).

1. Before the intervention (whether it is possible to recruit).
2. During the intervention (which links to retention and completion).
3. After the intervention (which relates to feedback from the patient and healthcare professionals and how useful the intervention was found to be).

Feasibility involved the logistics of conducting the intervention and whether it was possible to recruit, retain and complete the interventions and necessary training was possible.

Table 4. 1 The measures of feasibility and acceptability used in Study 3 (Edwards et al., 2019b)**.**

Feasibility	Acceptability
• Recruitment of patients • Retention of patients • Receipt of interventions by patients • Train community pharmacists to deliver consultations	• Recruitment of patients • Retention of patients • Completion by community pharmacist • Feedback (patients, pharmacists and content)

4.3.1 Recruitment of patients

An important part of assessing feasibility was to ensure that patients fitting the inclusion criteria could be recruited into the study (see page 46). Different methods of recruitment were developed iteratively to allow the study to recruit sufficient numbers; these were categorised as being either community methods or hospice methods (see Appendix 3 – Paper 3). One hundred and twenty-eight patients were identified from both community methods and hospice methods of recruitment. Identifying patients by community methods was successful but only 7% were then recruited into the study after postal invitation. Identifying patients from the hospice and inviting face-to-face resulted in a 40% recruitment rate. Face-to-face recruitment was found to be more successful than inviting patients to participate via post. Barriers to recruitment and completion included lack of engagement of key personnel involved in the recruitment process and recruiting from patients who were nearing the end of life.

4.3.2 Retention and receipt and completion

Twenty-three patients were recruited however four were lost to attrition. All those lost were from the discharge of hospice inpatient route signalling that these patients were perhaps too poorly to be included in further studies. Twenty-three patients were recruited into the proof-of-concept study and 19 completed it. No patients were lost between the first and second consultations of the NMS-style intervention showing an acceptability of the design of the intervention. As part of the iterative development of recruitment methods, the service was adapted part-way through the study to allow the RP to provide the service remotely by telephone (based on the two consultations of the NMS) to allow more patients to become eligible for the study. All community pharmacists asked to complete the MUR-style interventions did so and all offered feedback on the consultation the following day when asked.

4.3.3 Training of community pharmacists

The training session for the community pharmacists involved role play with a patient, interaction with a specialist palliative care nurse and a cancer support charity. Ten pharmacies were invited to attend, and all sent one or more representatives. This shows that this training design was feasible.

4.3.4 Feedback

Feedback was requested from patients who participated, pharmacists who provided the interventions and healthcare professionals involved in the care of patients involved.

Eleven of the nineteen patients taking part returned both pre and post-consultation questionnaires. These showed an improvement in medicines knowledge and a self-perceived benefit of having the consultations. Eight of the eleven patients would recommend the consultation to others. This feedback shows that the intervention was acceptable for patients who took part.

The four community pharmacists who took part all provided feedback the day after the consultation about the content of the consultation, MRPs found and pharmacist’s feelings about carrying them out. Content information relating to the MRPs found was also gathered following the consultations carried out by the RP. From 33 consultations, 47 MRPs were found and these were addressed by advice from the pharmacist on 33 occasions. Thirteen MRPs in eight patients were referred to other healthcare professionals, mostly for prescribing of extra medication. The fact that MRPs were discovered shows that there are unmet medicines support needs for participants and that the intervention was capable of identifying these. Details of the MRPs can be found in Figure 4.2.

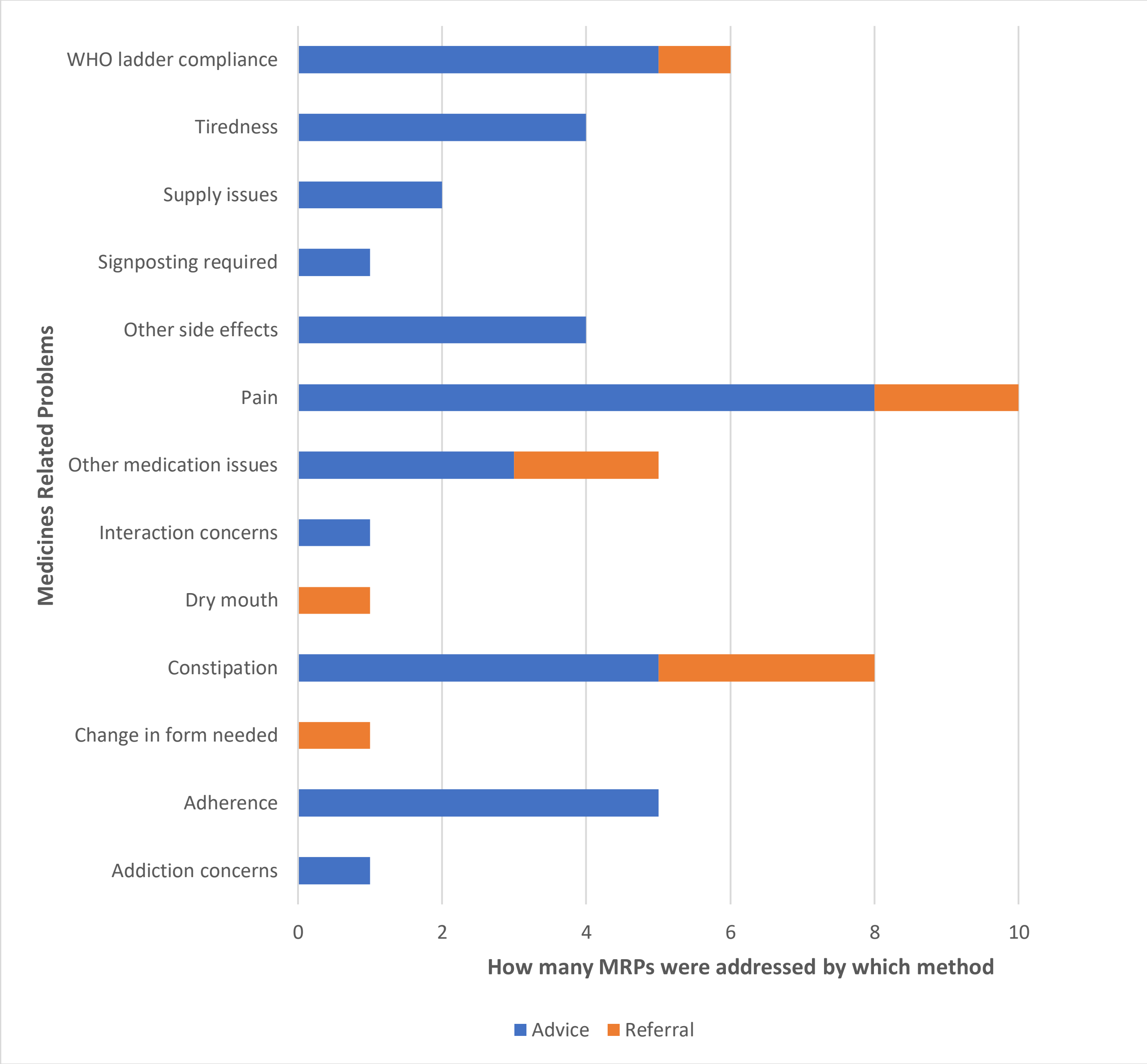


Figure 4. 2 A summary of MRPs found during pharmacist medicines consultations for patients with advanced cancer pain and whether they were addressed by advice or referral.

The feedback also indicated that two (out of four) community pharmacists found it difficult to in retain sufficient working knowledge to provide the service because they were delivering it so infrequently. Therefore, as part of the iterative development of recruitment methods, the service was adapted part-way through the study to allow the Research Pharmacist (RP) to provide the service remotely by telephone (based on the two consultations of the NMS) to allow more patients to become eligible for the study.

Healthcare professionals involved in patient care were also asked for feedback leading to only two responses. Both responses were positive although doubt was expressed about the need for such a consultation in this patient group who are already receiving specialist palliative care.

4.4 Summary

This chapter has presented the results from the study. There is a need for medicines support for patients with cancer pain, particularly for those not receiving specialist palliative care services. This support could be provided by the community pharmacist and it may benefit patients if this were to be provided over the telephone. Few studies have been conducted looking at pharmacist support for patients with cancer pain but those that have shown that such services have potential to make a positive difference for patients, although the studies showing this lack rigour and quality. The proof-of-concept study showed that pharmacist educational interventions are feasible to provide and acceptable for patients and can identify a substantial number of MRPs, even in those patients in receipt of specialist services. The following chapter will discuss the results and their wider significance in comparison to previous research findings.

Chapter 5 Discussion

This chapter presents a discussion of the research in the context of the literature. Medicines optimisation and person-centredness is discussed in terms of the results of the study and the challenges to pharmacist provision are then presented. A revised care package is then presented before a description of limitations.

5.1 Components of the proof-of-concept intervention

The components of interventions can be reported using the TIDieR checklist (see Table 5.1) (Hoffmann et al., 2014). This checklist describes the detail of the proof-of-concept study components or explains where they are available in this thesis.

Table 5. 1 The TIDieR checklist and details of the individual components.

TIDieR item	Details of the component in this study
1. Brief name to describe the intervention	A community pharmacist medicines optimisation service for patients with advanced cancer pain.
2. Any rationale, theory or goal of the elements essential to the intervention	Either an MUR consultation or an NMS-style consultation would be used (using all questions stated in the service specification) (Pharmaceutical Services Negotiating Committee (2017a), Pharmaceutical Services Negotiating Committee (2017b). The aim of this was to optimise the medication use of the patient to help address uncontrolled symptoms.
3. Any information used in the intervention (including training).	The participating community pharmacists all attended a training event, the content of which was based around the palliative care training needs of community pharmacists identified in previous studies (O'Connor et al., 2013, Hussainy et al., 2006, Savage et al., 2013). A specialist nurse and a cancer support charity provided information and role plays were conducted with a patient representative. The patient received an educational intervention in the form of an MUR or an NMS-style intervention (Pharmaceutical Services Negotiating Committee, 2017a, Pharmaceutical Services Negotiating Committee, 2017b). Information given during this intervention was assessed by the pharmacist and relevant to the needs of the patient.
4. Description of procedures used in the intervention.	The MUR or NMS-style consultation delivered was carried out in-person or by telephone. After confirmation that the patient still consented to take part, the consultation followed the questions recommended in the individual

	service specifications (Pharmaceutical Services Negotiating Committee, 2017a, Pharmaceutical Services Negotiating Committee, 2017b). Each medicine the patient was taking was discussed in turn and open questions about efficacy, side effects, compliance and knowledge were asked (as recommended). Due to the open nature of the questions, the patients were able to ask other questions about their medicines making the consultations variable in nature. The MUR is a one-stage consultation so there was only one patient contact. The NMS is in two stages where the initial telephone consultation is followed up 7-14 days later by an additional consultation using the same questions. If action was required following the consultation, it was taken and documented. Examples of action were to contact the prescriber and recommend additional prescribing or to flag up symptoms to the prescriber.
5. Description of expertise, background and training of intervention providers.	All pharmacists who provided the consultations were qualified and registered pharmacists who were accredited to provide the service and had attended the training session. Any SCR access was done so with the appropriate accreditation and permissions.
6. Modes of delivery of the intervention.	Appointments were agreed between the patients and the pharmacist in advance. All MUR consultations were carried out face-to-face with the patients (although patients were given the option of a telephone consultation). These were all carried out by the patient's usual community pharmacist. The NMS-style consultations were all carried out by the RP over the telephone using the two contacts previously described.
7. Locations where the interventions occurred.	The five MUR consultations all took place on participating community pharmacy's registered premises. The NMS-style interventions were delivered over the telephone with patients in their own homes. The RP delivering these was located at one of two registered community pharmacies

	who had access to SCR at the time or at the University of Bradford when this was not possible.
8. The number of times the intervention was delivered and how long it lasted.	The MUR consultations were delivered once and last between 20-60 minutes. The NMS-style interventions were delivered by two telephone consultations with patient contact time ranging between 9-29 minutes.
9. Any personalisation of the intervention	Five patients receiving the NMS-style intervention were not available at the pre-arranged time for the consultation so new appointments were made and adhered to. Due to hearing difficulties, one patient asked for their spouse to be present for the NMS-style consultation. Pharmacists conducting the consultations were able to use their professional judgement to tailor the intervention to the patients' needs as would be done in a standard MUR or NMS intervention. This tailoring involved additional questions or counselling. If there was a need for referral this was completed and documented (as described above).
10. Any changes to the intervention over the course of the study	Due to difficulties with recruitment, several different ethical amendments were made during the course of the study. All methods are detailed in Appendix 3. Methods of recruitment can be described as community-based (general practitioner computer search, identification by the general practitioner, community pharmacist or district nurse and hospital outpatient list search) or hospice-based (in and outpatient list search). An additional method of delivery was introduced in the form of the NMS-style intervention part-way through the study.
11. Description of any fidelity assessment.	Pharmacists were provided with a questioning grid to ensure all parts of the intervention were completed, these were not collected and assessed. A

	follow-up telephone call was also carried out the day after the MUR interventions to ensure consultations had occurred and to collect details of MRPs.
12. If fidelity was assessed, to what extent was it delivered as planned.	This was not assessed (see Limitations page 94).

This proof-of-concept study described a complex intervention with multiple components and variations. The iterative methods meant that the delivery method and personnel delivering the intervention needed to be changed during the course of the proof-of-concept study making it less clear which parts of the study had what effect on the outcomes.

The MUR or NMS-style consultations were delivered by a community pharmacist or the RP, both of whom would have had similar training although the RP may have had more palliative care knowledge. The intervention was based on a current community pharmacy service (either the MUR or the NMS) but was adapted for use in this patient group. Community pharmacists taking part were given training however similar medicines knowledge would be required to deliver the intervention as for standard community pharmacy services therefore it would not be something that could be delivered by a pharmacy technician (although this was not assessed).

The intervention was delivered both face-to-face and by telephone and the differences between these two delivery methods were not assessed (due to the sample size). No patients returning both pre and post intervention questionnaires reported the delivery method was problematic although numbers were very small. Future evaluation and testing of the service could include patient feedback and comparison between the two groups.

Patients who were given the MUR-style intervention were only given one consultation compared with the two offered for the NMS-style intervention. Again, effectiveness was not measured of either delivery method but an average of 1.2 MRPs were seen in those receiving the MUR-style intervention compared with an average of 2.6 MRPs in those receiving the NMS-style intervention. This may have been due to the difference in number of consultations or alternatively due to the difference in personnel conducting the consultations.

The MUR-style interventions were carried out with access to the PMR where dispensing history from that pharmacy was available. The majority of the NMS-style interventions were carried out with access to the SCR with a limited snapshot of the patients NHS health record. Both sources of information are incomplete and it is unclear what effect this would have had on the outcome of the intervention.

All medicines optimisation interventions have a framework for completion and questions based on these frameworks were provided for the pharmacists involved. There will still be differences in intervention delivery due to the individual communication skills of those involved and this may have led to differences in identification of MRPs from different pharmacists.

Participants receiving the intervention in the proof-of-concept study were mostly already in receipt of specialist palliative care (17/19). It would be useful in future studies to recruit more patients not receiving specialist palliative care so this group could be compared with those who are receiving it showing the difference in types and numbers of MRPs experienced.

5.2 Medicines Optimisation by community pharmacists for patients with cancer pain

The research in Study 1 (Interviews with patients with cancer pain) clearly demonstrates that medicines optimisation is not being effectively delivered for patients with cancer pain. Several themes were revealed during the course of this research which highlight the lack of service provision for this patient group.

5.2.1 Unmet needs of patients with cancer pain

It is clear from the patient voices heard in this research that there are still unmet medicines support needs for patients with cancer pain, exemplified by one patient who described being in a lot of pain and how they “just sort of struggle through” (patient S7P1) (Appendix 1 – Paper 1).

This patient group does not currently access medicines optimisation services in community pharmacy for reasons explained on pages 24-27 (Savage et al., 2013, Edwards et al., 2018). However, patients are amenable to the idea of medicines consultations and when they were provided, they were found to be acceptable and potentially valuable for this group.

Medicines optimisation was introduced in 2005 as a “one size fits all” concept to help professionals inform care so that patients get the most possible benefit from their medicines (Royal Pharmaceutical Society, 2013). However, all patients have different needs and patients with pain from cancer have distinct needs which do not fit with current medicines optimisation principles (Edwards et al., 2018).

Patients approaching the end of life do not necessarily need an evidence-based choice of medicine for every condition with which they have been diagnosed, but they do need the medicines that are right for them to control their symptoms. This may mean deprescribing is required to stop medication that is not appropriate for patients at the end of life and there is a need for clear guidelines in this area to manage this (Todd et al., 2017). This work has shown that patients are often left to try and manage symptoms on their own which is unacceptable as patients with cancer pain can have complex medicines regimens with needs that change regularly and often rapidly (Edwards et al., 2018) (Hackett et al., 2016). Such gaps in service provision may not be apparent to healthcare professionals as patients may not proactively seek help for many reasons (Giardini et al., 2017). One patient presented in the study was in “too much pain” to take his medicines (Edwards et al., 2019b). Whilst this may seem extraordinary to someone who is not in pain, pain can cloud judgement and the ability to make decisions; although in this instance no-one had ever explained to this patient how to use their medicines to gain symptom relief (Linton and Shaw, 2011, Edwards et al., 2019b).

Support provided for patients with cancer pain is varied and patients described experiencing many different models of care (Edwards et al., 2018). We know from other research that only 65% of patients are ever referred to specialist palliative care, but this work has found that those who are in receipt of this still experience different levels of support (Ziegler et al., 2018, Edwards et al., 2018). Although it is fourteen years since medicines optimisation services were introduced and they are currently undergoing change, it seems the optimal service for this patient group is yet to be found (National Health Service England and National Health Service Improvement, 2019). The imminent removal of MURs from community pharmacies and placing a similar service into the primary care GP practice environment makes access to services potentially more difficult for community-based patients, who face the possibility of services targeted to particular populations (e.g. patients with diabetes, patients who are homeless), with little opportunity for patients outside those groups presenting with acute needs (NHS, 2019b).

Educational interventions for patients with cancer pain have shown some potential in the few studies that have been carried out before this work although these studies lacked rigour and clear reporting (see Appendix 2 – Paper 2). Previous studies were not framed as medicines optimisation interventions as they were carried out before the concept was conceived or in a country where medicines optimisation has not been adopted although there were some similarities (Powers et al., 1983, Wang et al., 2013, Wang et al., 2015, Chen et al., 2014). Patients with cancer pain seemed to gain benefit from medicines consultations with a community pharmacist in previous studies and an increase in knowledge was seen after they had been carried out.

5.2.2 Additional skills of community pharmacists

Study 3 found an average of 2.5 MRPs per patient in the proof-of-concept study with 47 in total (Appendix 4 – Paper 4). Of these 9 had to be referred to other healthcare professionals for additional prescribing. If the community pharmacists doing the consultations had obtained additional prescriber qualifications this additional step would have been prevented.

Training needs of pharmacists providing services for cancer pain should be addressed before any such service is delivered. Most (but not all) community pharmacists provide medicines optimisation services as part of their normal role, however some who do not, may lack confidence when asked to provide them (Savage et al., 2013). A combination of consultation skills and knowledge of advanced cancer care would be necessary to provide such a service and pharmacists vary in their training needs for this.

5.2.3 Community pharmacist provision

Some community pharmacists in Study 3 found it difficult to retain the working knowledge required to provide educational interventions for patients with cancer pain. This was because of the infrequent nature of the consultations for each community pharmacist and the gap between training and service provision thus additional knowledge was not reinforced and the consultation was not embedded within the pharmacy. Only 5 of the 33 consultations were provided by community pharmacists before the methods were changed which is not enough to exclude provision in this way. The service could potentially be provided by a community, hospice, hospital, primary care or centralised pharmacist dependent on training and access to records. More work needs to be done to confirm the best delivery model for this service.

5.3 Person-centredness

Person-centred care (as detailed on pages 10-12) ensures the patient is the focus of all the care they receive and that the care is personalised towards them and coordinated with all agencies involved (The Health Foundation, 2019). All this should be done whilst the patient is being treated with dignity and respect in line with the NHS Core Values (NHS & Health Education England, 2019).

5.3.1 Personalised care

This work found that patients are often left without support, and, in pain, particularly those who have no access to specialist services. Concerns of patients (such as too many medicines) were not always acknowledged and listened to and that what could be important for a patient were sometimes dismissed by their healthcare professional. This may make the patient feel like their views and opinions are not worthy of recognition by their healthcare team. If healthcare professionals are seen to belittle the views and feelings of patients it may make patients feel unimportant and that they need to adapt to the healthcare system rather than the healthcare system needing to adapt to them as person-centred care intended. Patients value healthcare professionals thinking about their wider needs rather than just concentrating on the issue the clinician deems to be most important (Mazor et al., 2013). The NHS Long Term Plan aims to offer support for patients to remain in their own homes, so allowing patients to self-manage and control their own symptoms however this is not yet effectively delivered in practice (NHS, 2019b). Not all care was found to be inadequate but where patients received good care it was because the individual healthcare professionals were person-centred rather than the system (Ross et al., 2015).

This series of studies has found that patients are open to the idea of additional consultations although did not suggest it themselves as they may be bounded by their experiences and if they haven’t ever received such a service, they would be unlikely to suggest it. Any future service needs co-created with patients as feedback is difficult to obtain in a population at the end of life (White et al., 2008b).

5.3.2 Communication

Coordinated care can only happen where there is effective, two-way communication between healthcare professionals involved in patient care. As currently, the community pharmacist does not have access to patient records and receives only ad-hoc communication about patients, they cannot be involved in providing coordinated care for patients. One patient in Study 1 was surprised their information was not available to their community pharmacist. In Study 3 the lack of transparency made the identification of patients who may benefit more difficult than it needed to be but also did not allow the pharmacist access to information that may have helped them improve patient care. Improved communication between community pharmacists and the rest of the healthcare team may provide more benefits than just for symptom control; they could ensure new products, product shortages or new services are communicated with the wider team to improve patient care further.

5.3.3 Identifying patients in need

The difficulties experienced finding patients in need of support for Study 3 show the healthcare system is, as yet, unable to identify patients with particular symptoms (Edwards et al., 2019a, Savage et al., 2013). This, again, is a lack of personalisation and coordination; with the NHS leaving patients without services that could potentially be of value to them. NICE recommends local systems to be in place for identification of patients needing support and although recommendations are made in Study 3, the challenge of finding patients before referral to palliative care (or indeed those who never receive that referral) warrants further investigation (Excellence, 2015b). Recommendations in the ‘Every Moment Counts’ document discussed on page

14, advise that patients have access to round-the-clock support although it is clear that not all patients receive this (The National Council for Palliative Care & VOICES, 2015).

5.3.4 Access to medicines

Patients in Study 1 described having to employ methods to ensure they always had access to their medicines. Patients are required to do this in different ways in different GP practices and often have time stipulations as to when they are allowed to make a request. They then need to navigate the transfer of the prescription to the community pharmacy, and the obtaining of stock which is often not held (Savage et al., 2013). This process may be repeated several times a month even for routine medicines. Also, due to the complex nature of patient care, patients can get medicines prescribed from secondary and tertiary care settings which may also need to be supplied by community pharmacies. The navigation of this system of access to medicines is difficult for anyone on a complex medicine regimen to manage however, if a patient is seriously ill and approaching the end of life, this may not be possible without the help of a carer or family member, which not everyone has.

5.4 Challenges of pharmacist-delivered person-centred medicines optimisation for patients with cancer pain

The findings of this study demonstrate that medicines optimisation is ineffective for patients with cancer pain and they are often left with unmanaged symptoms. The study described care that is not person-centred through lack of personalisation and coordination leaving patients feeling like they must accept inadequate care whilst they are approaching the end of life. Table 5.1 summarises the challenges of person-centred pharmacist-delivered medicines optimisation for advanced cancer pain and potential solutions to these challenges.

Table 5. 2 A table showing the challenges of person-centred pharmacist delivered medicines optimisation services for patients with advanced cancer pain; and the potential solutions to these challenges with barriers and facilitators.

Number	Challenge	Potential solution	Barriers	Facilitators
1	Unmet medicines support needs of patients with cancer pain (Edwards et al., 2018).	Offer all patients with cancer a medicines optimisation consultation with a pharmacist.	Difficult to identify subset of population who would benefit most from intervention.	Patients are identifiable through their cancer code and analgesic in their record.
			The role of the pharmacist is not always clear to patients and other healthcare professionals	Communicate benefits of an intervention to patients and rest of the healthcare team. Healthcare team would then refer into service.
2	No current pathways into medicines optimisation services for patients with cancer pain (Edwards et al., 2019a, Savage et al., 2013, Edwards et al., 2019c).	Offer all patients with cancer pain a medicines optimisation consultation with a pharmacist.	Difficult to identify subset of population who would benefit most from intervention.	Patients are identifiable through their cancer code and analgesic in their record.
			The role of the pharmacist is not always clear to patients and	Communicate benefits of an intervention to patients and rest of the healthcare team. Healthcare team

			other healthcare professionals.	would then refer into service.
			Resources to deliver an intervention	Additional resource may be offset by savings in admissions/ drugs and improvements in symptom control.
			Training necessary for pharmacist.	Training package developed for pharmacist delivery
3	Lack of person-centredness of services for patients with cancer pain (Edwards et al., 2018).	All healthcare professionals are trained in person-centredness and regular ongoing training is provided.	Difficult to find time and money for additional training and monitoring in healthcare system.	Additional resource may be offset by savings in admissions/ drugs and improvements in symptom control.
		Any new service is co-designed with patients and followed up with patient feedback where possible.	Difficult to obtain feedback in patients with a rapidly changing health state	Co-design of a service with user groups would enable a person-centred service.
				Novel methods of feedback could obtain timely information from patients
4	Difficult to know what patients with cancer feel about new services (Edwards et al., 2019c,	Any new service is co-designed with patients and followed up with patient feedback where possible.	Difficult to obtain feedback in patients with a rapidly changing health state.	Co-design of a service with user groups would enable a person-centred service.

	Edwards et al., 2019b, White et al., 2008b)			Novel methods of feedback could obtain timely information from patients.
5	Lack of communication of information about the patient with all members of the healthcare team (Savage et al., 2013).	Integrated clinical systems between care settings (including community pharmacies).	Cost of integrating systems.	Additional resource may be offset by savings in admissions/ drugs and improvements in symptom control.
			Other healthcare professionals may be resistant.	Communicate benefits of an intervention to patients and rest of the healthcare team.
				Patient held health records or integrated health records

5.5 Recommendations for an enhanced model of care

In response to the challenges of pharmacist delivered person-centred medicines optimisation for patients with cancer pain and the potential solutions; a new medicines optimisation wheel – Medicines Optimisation for Cancer Pain (MOCAP) – has been specifically designed for patients with cancer pain and is presented in Figure 5.1. This has been produced as a result of the whole body of work in this thesis and is for patients with cancer pain. The challenges and potential solutions found in Table 5.1 have been mapped onto the new wheel.

The methodology used to design the new wheel is called MOPAP (Medicines Optimisation for a Patient Population). This is a stepwise process to produce a person-centred medicines optimisation wheel (see in Figure 5.2).

The MOPAP could theoretically be applied to other groups of patients with other medical conditions such as diabetes or dementia leading to a specific wheel for each condition.

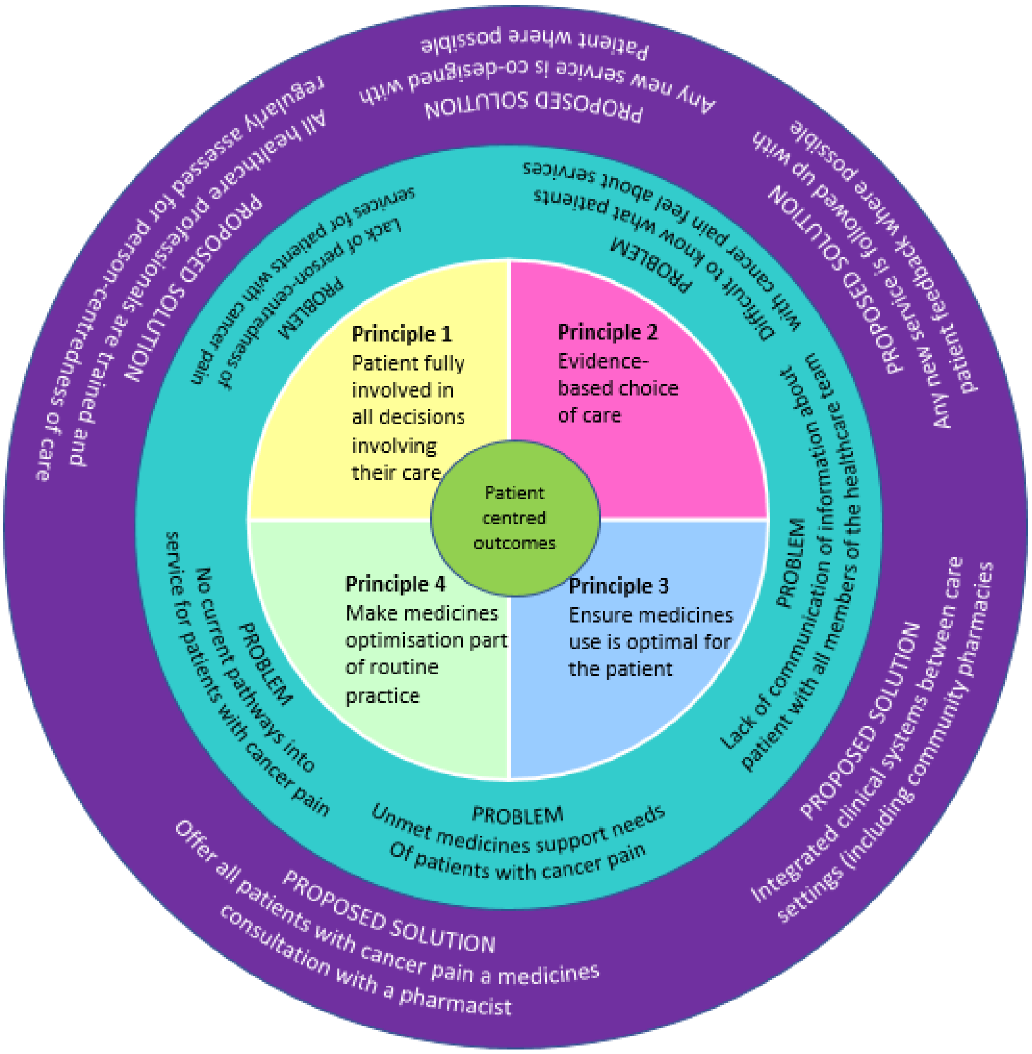


Figure 5. 1 MOCAP (Medicines Optimisation for Cancer Pain): Proposed medicines optimisation wheel for patients with cancer pain (adapted from RPS Medicines Optimisation wheel) (Royal Pharmaceutical Society, 2013)

The proposed new wheel is in response to challenges faced for person-centred medicines optimisation for patients with advanced cancer pain and shows the proposed solutions to those challenges. The principles of the internal Medicines Optimisation wheel within have been changed in response to the specific needs of this patient group (Royal Pharmaceutical Society, 2013, Edwards et al., 2018).

Principle 1 has been changed to not only understand the patient experience but also to ensure that their care is person-centred and they are part of any decisions made about them (The Health Foundation, 2019).

Principle 2 has been changed to reflect the stage of life the patient is in. Whilst a medicine may have evidence for use for the symptom being experienced, it may not be right to use it in patients with advanced cancer at the end of life. In many cases patients may benefit from deprescribing – where medicines that are unlikely to benefit them may be stopped – but this must always be done following two-way discussion with the patient (Scott et al., 2015, Todd et al., 2017).

Principle 3 has been amended to reflect that medicines use at the end of life needs to be right for the patient. Although a large dose of morphine may address the patient's pain, it may also lead them to be too drowsy to make the most of the time they have left. The patient needs to be in control of their medicines and be supported to be able to manage them as best as they are able (Edwards et al., 2018).

Principle 4 remains, in the main, unchanged as a philosophy however practically ensuring that medicines optimisation is seen as a dynamic entity which is capable of responding to patient needs and environmental changes.

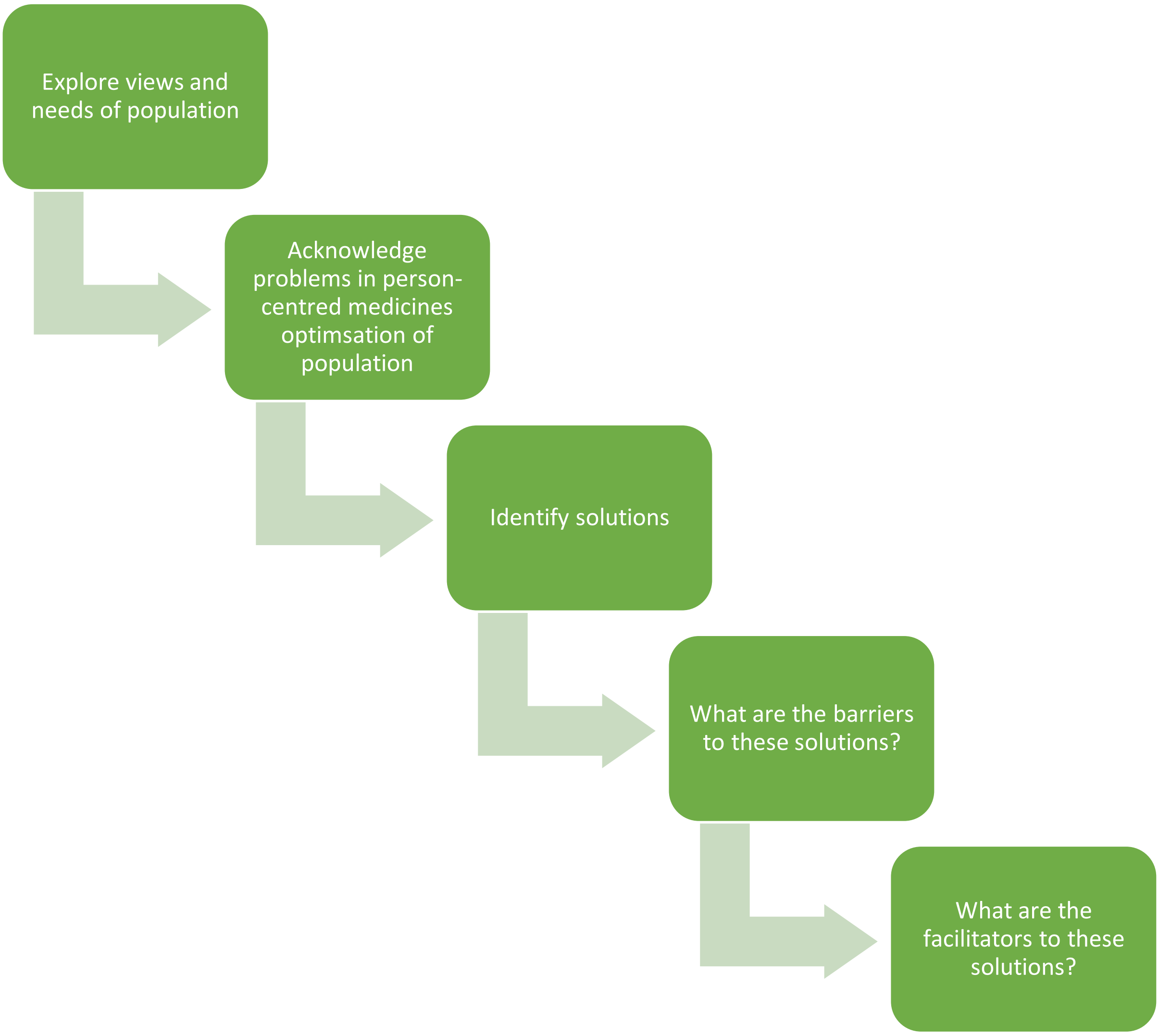


Figure 5. 2 MOPAP (Medicines Optimisation for a Patient Population). The steps needed to identify person-centred medicines optimisation solutions for a specific patient population.

5.6 Limitations of proposed model of care

More research is needed before a new medicines optimisation model can be implemented for patients with cancer pain. The new targeted medicines optimisation wheel seen in Figure 5.1 allows the option to offer all patients with cancer a medicines optimisation consultation. Further work looking at the most appropriate and useful timing for such an intervention is required if patients are to be offered the optimal balance between service provision and services that are surplus to requirements.

Integrated care records would be useful for all involved but current services would need much development before this could happen. An alternative, more person-centred option to integrated health records would be personal health records allowing not only the healthcare professionals to communicate but also the patient to be in control of their records (Caligtan and Dykes, 2011).

Although this work found that community pharmacists found it difficult to retain knowledge to carry out these services, this is only based on a limited number of responses so further work could explore whether this would be the right setting for delivery. Further work could investigate whether hospice, hospital, CCG or practice pharmacists are better placed to provide such services.

5.7 Current climate of change

The landscape of the NHS is changing, and this may influence medicines optimisation services that may be offered to patients (see Figure 5.3). There are aspirations for more joined-up care, preventing inequalities and improved technologies within the NHS which need to be rolled out across the UK so benefits may be seen by all (NHS, 2019b). These changes may be beneficial and allow improved access to support in new ways such as personal health budgets for people approaching the end of life and expansion of services (such as the NMS) and local commissioning. Unfortunately, negative consequences may also occur. Current medicines shortages are expected to get worse following Britain's exit from the European Union (2013, Steer, 2019). Although the government and NHS is working hard to mitigate any supply issues, it is as yet unclear what the consequences might be of a 'no-deal' Brexit (National Health Service, 2019). Care that is commissioned locally may lead to a disparity of services between different postcodes with patients potentially missing out on services depending on where they live (Together for short lives, 2017).

The NHS is a complex health system and any changes made can lead to further unpredictable changes elsewhere in the system. Any new model adopted would need to be closely monitored to prevent negative consequences elsewhere.

Figure 5. 3 Changes to the NHS which could potentially affect medicines optimisation services

Community pharmacy is also undergoing much change. During the course of this study SCR access was introduced (as discussed in Chapter 2.4.1) allowing partial access to health records. Although an increase in information sharing is welcome, the SCR still does not allow two-way effective communication between all members of the healthcare team. It is hoped that further improvements in communication will be seen in the future.

In July 2019 the UK government announced a phasing out of MURs in community pharmacies to be replaced by the Structured Medication Review being delivered by the evolving role of Pharmacists working in GP practices (as discussed in Chapter 2.2). This may lead to a decrease in the positive contribution of community pharmacists to patient care. The MUR was the first widespread medicines optimisation service so community pharmacists may be sad to see it go however there was also an announcement of the expansion of the NMS service although no details have yet been released about this.

Funding reductions in community pharmacy are leading to the development of hub and spoke dispensing models where centralised ‘hubs’ dispense medication and deliver out to ‘spoke’ collection and delivery points. This new way of providing community pharmacy services will provide new challenges such as local community pharmacy closures. There will also be opportunities from the changes, as the pharmacist will have more free time to enable them to develop and deliver services in existing community pharmacies. The new hub and spoke model may allow a centralised telephone delivery of services from dedicated pharmacists. Patients may find improvements in efficiency with faster delivery and more accurate dispensing. Direct and indirect changes will be seen in the coming months and years as they develop. It may be that new roles and delivery personnel of services will be developed, perhaps with specialised pharmacists (either in setting or speciality) playing a larger role. An example of this could be the delivery of medicines optimisation services for patients with advanced cancer by pharmacists working in hospices.

5.8 Summary

Chapter 5 presented a discussion of the research. Medicines optimisation services by pharmacists for patients with cancer pain show potential for future development. Care for patients with advanced cancer is not person-centred but dependent on how person-centred the healthcare professionals providing the service are. Challenges to person-centred medicines optimisation were discussed before a new model for person-centred medicines optimisation for patients with cancer pain was been presented.

Chapter 6 will conclude the thesis and will provide explanation of the contribution of this work.

Chapter 6 Conclusions and Future work

This chapter presents the conclusions of this work, its significance and the contribution to the knowledge in this field will be demonstrated.

6.1 Research conclusions

The aim of the study is to investigate pharmacist educational interventions for patients living with advanced cancer pain in the community. The research question was:

Can community pharmacists positively contribute to the end of life care of patients with advanced cancer pain?

This can then be sub-divided into the following questions which are addressed in each of the studies.

STUDY 1 How do patients with advanced cancer pain perceive a community pharmacist delivered medicines optimisation service?

Paper 1 (Appendix 1)

Edwards, Z., Blenkinsopp, A., Ziegler, L. and Bennett, MI. (2018). **How do patients with cancer pain view community pharmacy services? An Interview study**. Health & Social Care in the Community. 26:4. Pages 507-518 DOI:10.1111/hsc12549.

https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.12549

STUDY 2 What do we already know about community pharmacy services for patients with advanced cancer pain?

Paper 2 (Appendix 2)

Edwards, Z., Ziegler, L., Craigs, C., Blenkinsopp, A. and Bennett, MI. (2019). **Pharmacist educational interventions for cancer pain management: a systematic review and meta-analysis**. International Journal of Pharmacy Practice. Vol 27: 4, pages 336-345.

DOI:10.1111/ijpp12516.

https://onlinelibrary.wiley.com/doi/full/10.1111/ijpp.12516

STUDY 3 Is a pharmacist delivered medicines optimisation consultation feasible and acceptable for patients and healthcare professionals?

Paper 3 (Appendix 3)

Edwards, Z., Bennett, MI., Petty, DR. and Blenkinsopp, A. (2019). **Evaluating recruitment methods of patients with advanced cancer: a pragmatic opportunistic comparison.** International Journal of Pharmacy Practice. Vol 27: 6, pages 536-544.

DOI: 10.1111/ijpp12562

https://onlinelibrary.wiley.com/doi/10.1111/ijpp.12562

Paper 4 (Appendix 4)

Edwards, Z., Bennett, MI. and Blenkinsopp, A. (2019). **A community pharmacist medicines optimisation service for patients with advanced cancer pain: a proof of concept study.** International Journal of Clinical Pharmacy. Vol 41: 3, pages 700-710.

DOI: 1007/s11096-019-00820-8.

https://link.springer.com/article/10.1007/s11096-019-00820-8

Three studies were conducted in order to deliver this overarching aim. It can be concluded that pharmacists can potentially make a positive contribution to the health of patients with advanced cancer pain, but further study needs to be undertaken to ascertain whether community pharmacists are best placed to provide services. Health improvements include reduction in levels of pain, improvements in knowledge and reduction of side effects but studies need to be carried out on a larger scale in a Randomised Controlled Trial (RCT) to confirm although an RCT in this patient group may be challenging (White et al., 2008b).

Medicines consultations by pharmacists were found to be previously under-researched with few experimental studies being previously conducted. They have a place to provide medicines support for patients with advanced cancer and a potential pathway has been developed to provide them. Community pharmacists found the training, knowledge and skills difficult to retain as they were providing the consultations so infrequently however a centralised pharmacist model is also worth further exploration.

6.2 Summary of contribution to practice

This work explored areas that had never been investigated before. Services, already used within the NHS, were adapted for use in a patient group who currently do not have access to medicines optimisation services. A summary of this contribution to practice is as follows:

1. There is a need for medicines support for patients with advanced cancer and patients were willing to receive services remotely and that this might even be better for them.
2. Pharmacist medicines consultations for patients with cancer pain are acceptable for patients and feasible to deliver.
3. Community pharmacists found it difficult to retain working palliative care knowledge as they were using it so infrequently.
4. MRPs such as pain and constipation were found, even in those already receiving specialist palliative care, and most of these were addressed through pharmacist advice. This could potentially reduce demand on GPs and out-of-hours services such as emergency doctors and accident and emergency. This could influence future training for healthcare professionals and service design. Pharmacist-delivered medicines optimisation interventions could also be used to assess MRPs for other medical conditions therefore affecting training and service design for other disease states.
5. It is the first-time current NHS pharmacy services have been adapted for use in patients with advanced cancer.
6. If proven to be beneficial for patients with cancer pain this work and the resulting definitive trial could potentially lead to a new community

pharmacy service being commissioned by the NHS in the UK to help patients with advanced cancer who need medicines support. Work is currently being continued towards this.

7. A large national pharmacy chain is planning further development of their work in palliative care and have expressed interest in using the results of this study to inform it.

6.3 Summary of contributions to academia

This area of study is novel and has contributed to academia in several ways. These contributions are as follows:

1. The area of medicines optimisation and person-centred care at the end of life has been explored and an evidence-based enhanced model of person-centred medicines optimisation (MOCAP) has been presented. This could potentially lead to a new model of care with pharmacists being part of the multi-disciplinary team and providing joined-up, informed and timely care for patients with cancer pain.
2. The development of MOCAP has led to the development of a medicines optimisation model to be applied to other medical conditions (MOPAP). This could potentially lead to enhanced models of care for other medical conditions.
3. Community pharmacist services for patients with advanced cancer pain is an under-researched area and there is a need for further well-designed and reported studies. This work contributes to and extends this agenda.

4. Engagement of healthcare professionals in the design and conduct of studies researching cancer pain is helpful for recruitment. Face-to-face methods are more effective than using postal invitations.
5. This is the first study to have involved pharmacist access to the SCR as part of the research. It has shown short-comings in information available and may lead to further developments in access.

The papers included in this thesis are all recent so have not yet had chance to gain many citations. Social media is a relatively new way of showing impact and reach of academic research and this along with figures from Researchgate are included in Table 6.1 for each paper.

Table 6. 1 A table showing current reach of the work included in this thesis (correct on 10/9/19)

Paper and publication date	Journal	Research-gate and Mendeley	Citations	Social media mentions	Reads/ Downloads
1 **Feb 2018**	Health & Social Care in the Community	2 + 23	2	22	unknown
2 **Feb 2019**	International Journal of Pharmacy Practice	42 + 6	1	28	unknown
3 **July 2019**	International Journal of Pharmacy Practice	9	1	12	n/a
4 **April 2019**	International Journal of Clinical Pharmacy	31 + 8	1	22	>1000

Paper 4 was the only paper that was published with Gold open access and it received a large amount of interest. According to Altmetric figures, out of nearly 13 million papers ever tracked it was in the top 10% a month after it had been published. It is hoped that this early interest, particularly in Paper 4 will convert to citations over time.

6.4 Recommendations for future studies

This research has paved the way for further research in several areas, some of which is already happening and some of which may happen in the future.

The development of the new MOPAP and MOCAP models should be further explored. MOPAP could be used to identify opportunities for improving medicines optimisation for other medical conditions leading to studies to assess feasibility of the solutions found. MOCAP and its proposed solutions could be further explored in the form of another feasibility study. A training package could be developed to support intervention delivery and exploration of read and write record sharing between healthcare professionals could be compared with patient-held record use.

This study found it difficult to recruit patients who had medicines support needs but had not yet been referred to specialist palliative care. Longitudinal analysis of the journeys of patients with cancer through the healthcare system could be carried out. This could be carried out at the same time as periodic pain assessments and the two could then be mapped together to find the group of patients who would most benefit from support. Further studies could then be done to find ways of identifying that patient group from its place in the system.

Whether the community pharmacist is the pharmacist best placed to deliver a medicines optimisation intervention is still unclear. Their lack of working palliative care knowledge led to a further grant being awarded to investigate a hospice pharmacist delivery model. This in-turn has led to a national exploration of the role of the hospice pharmacist before a feasibility study to investigate a telephone-delivered medicines support service for patients with advanced cancer.

A proportion of the MRPs found during the course of the proof-of-concept study needed to be referred back to a prescriber for additional medicines to be prescribed. If the pharmacist providing the consultation had a prescribing qualification this would have been easier to address and led to quicker resolution for the patient. The hospice pharmacist study will explore this further by using a mixture of non-prescribers and prescribers to carry out consultations for the feasibility study.

The MRPs discovered during the course of this research could also be further explored. A comprehensive picture of problematic and uncontrolled symptoms for patients with advanced cancer could then inform future training for healthcare professionals working in primary and palliative care. MRPs could also be explored for patients with other conditions. This could be done from current or future pharmacist interventional studies and would give a picture of the main MRPs for each patients group. These could then inform training for healthcare professionals working in that area.

Current NHS services were found to have potential for use in an additional disease area. A recent announcement of the expansion of the NMS service could provide the gateway for this service to be commissioned and it could provide the basis for development for other diseases (National Health Service England and National Health Service Improvement, 2019). Other areas for expansion could include non-cancer pain, diabetes and gastro-oesophageal reflux disease.

SCRs were found to be inadequate when providing person-centred medicines optimisation for patients with cancer pain. Future research into full read and write access to patient records for community pharmacies could investigate whether this could be beneficial to patient care.

Remote consultations were found to be acceptable for patients during the course of this study. The NHS suggested an increasing access to consultations through the use of remote technologies (NHS England & British Medical Association, 2019). Further research into telephone or computer-based consultations by all healthcare professionals could assess patient appetite for such a service and whether this would have an effect on access to care for different patient groups.

6.5 Recommendations for policy makers

There is a clear need to simplify the pathway of care for patients and provide much needed symptom control services in an easily accessible way. This work has shown that pharmacists can contribute to care of patients with advanced cancer pain. Current funding reductions are leading to the closure of community pharmacies potentially losing the skills and knowledge of those within them (Burns, 2018). Pharmacists could be re-trained to provide targeted services for patients with advanced cancer and potentially for other disease areas.

There are unmet needs of patients with advanced cancer pain and the MOCAP model could be integrated into primary care on a local GP surgery level or at a wider CCG level. Improvements in communication systems and access to these systems could allow all involved in patient care to provide a joined-up targeted solution for patients in need of support, not just in this disease area but also beyond. Accessibility to services for all patients should be considered.

Person-centred care is not currently being delivered consistently and further training and monitoring should be carried out to ensure the patient and their needs are the prime concern for everyone working in the healthcare system.

6.6 Study limitations

Patients interviewed for Study 1 were a relatively even mix of those who were and were not receiving specialist palliative care leading to a broad range of views. However, the majority of those recruited for the medicines consultation study (Study 3) were already receiving specialist services. We know from previous research that only 65% of patients who die from cancer ever receive specialist palliative care and, when they do, the average contact time is only 6 weeks meaning that this unsupported group were mostly excluded from this Study 3 (Ziegler et al., 2018, Bennett et al., 2016). Patients who had not yet (or would never be) referred to specialist palliative care would perhaps benefit more from support with their medicines, although those who had already been referred would potentially already be more poorly than those who had not. This second group would already have access to specialist support so would have the opportunity to have round-the-clock access to healthcare advice. Further studies would benefit from exploring the MRPs experienced by both those receiving and not receiving specialist palliative care to understand which occur in which group.

Due to the iterative development of the methods used and the reliance on other healthcare professionals for recruitment, some data was not collected or recorded. Initially, it was not clear what would be important for the study and collecting data on why patients did not take part would have been useful, so methods could be adapted accordingly. This can inform the design of future studies.

The multiple consultation delivery methods used make it difficult to definitively rule out a community pharmacist delivery model for this intervention. Only 5 consultations were carried out by community pharmacists and only two individuals expressed concerns over retaining knowledge. This could also benefit from further exploration.

The fidelity of intervention delivery was not assessed as part of the proof-of-concept study. The pharmacists all used a questioning grid to ensure all parts of the intervention were completed but these were not all returned to the researcher after the study. In a future feasibility study, fidelity would be assessed by the completion and return of the questioning grids. Fidelity could be further examined by assessing the knowledge of the pharmacists at the end of their training session and a proportion of interventions could be recorded to assess whether the individual components of the intervention were being carried out.

A limitation and a strength of this research is that the researcher was embedded within the research and carried out many of the consultations as the RP. Mechanisms were put in place to maintain objectivity however these may not have always been effective. If the researcher had not been a pharmacist and actively involved in the research, it may not have been possible to adapt the recruitment methods and certainly the delivery method of the consultations to ensure the study was successful.

During the period of the research the landscape changed within pharmacy in the UK. The introduction of SCR improved communication between community pharmacists and other healthcare professionals although this could still be improved further (NHS Digital, 2017).

The research was carried out in one geographical area and healthcare and behaviours may be different compared with elsewhere in the country.

In the systematic review, it is possible that some studies were not found due to language constraints or if they were not yet or ever published.

6.7 Summary

Medicines optimisation services for patients with cancer pain are currently not provided adequately. A new model has been proposed for patient-centred medicines optimisation services for patients with cancer pain (MOCAP) and the same developmental process could potentially be used to find new medicines optimisation models for patients with other medical conditions (MOPAP).

The NHS Long Term Plan aims to improve choice and control for patients whilst still delivering high quality and compassionate care. The proposed new model presented in this research allows a way of delivering to these aims and still allowing patients to be supported in their own homes.

This area of study is novel and has been shown to show the potential patient benefit of a pharmacist delivered educational intervention for patients with cancer pain. Both academic and practice-based knowledge has been increased by this study and further areas for research have been identified.

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Appendix 1

Paper 1

How do patients with cancer pain view community pharmacy services? An Interview study.

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ORIGINAL ARTICLE

WILEY Health and Social Care in the community

How do patients with cancer pain view community pharmacy services? An interview study

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Abstract

Pain experienced by many patients with advanced cancer is often not well controlled and community pharmacists are potentially well placed to provide support. The study objective was to explore the views and experiences of patients with advanced cancer about community pharmacies, their services and attitudes towards having a community pharmacist pain medicines consultation. Purposive sampling of GP clinical information systems was used to recruit patients with advanced cancer, living in the community and receiving opioid analgesics in one area of England, UK between January 2015 and July 2016. Thirteen patients had a semi-structured interview which was audio-recorded and transcribed verbatim. Data were analysed deductively and inductively using Framework analysis and incorporating new themes as they emerged. The framework comprised Pain management, Experiences and expectations, Access to care and Communication. All patients reported using one regular community pharmacy citing convenience, service and staff friendliness as influential factors. The idea of a community pharmacy medicines consultation was acceptable to most patients. The idea of telephone consultations was positively received but electronic media such as Skype was not feasible or acceptable for most. Patients perceived a hierarchy of health professionals with specialist palliative care nurses at the top (due to their combined knowledge of their condition and medicines) followed by GPs then pharmacists. Patients receiving specialist palliative care described pain that was better controlled than those who were not. They thought medicines consultations with a pharmacist could be useful for patients before referral for palliative care. There is a need for pain medicines support for patients with advanced cancer, and unmet need appears greater for those not under the care of specialist services. Medicines consultations, in principle, are acceptable to patients both in person and by telephone, and the latter was perceived to be of particular benefit to patients less able to leave the house.

KEYWORDS
cancer, community pharmacy, medicines, needs and experiences of cancer patients, palliative care, pharmacy practice research

1 | INTRODUCTION

Three quarters of people who die from cancer will have experienced pain and it is the most common reason patients with cancer contact out-of-hours services (Adam, Bond, & Murchie, 2015; IMPACCT, 2016). Pain is less well controlled among patients living in community settings compared with those in the hospice or hospital (VOICES National Survey of Bereaved People, 2014). Cancer pain is complex and often changes rapidly with disease progression (Hackett, Godfrey, & Bennett, 2016). Many patients increasingly want to spend their last days and weeks in their own homes which has created an increasing need for community-based patients to be better supported to ensure they receive pain management (Adam et al., 2015; Bennett, Bagnall, & Closs, 2009; Closs, Chatwin, & Bennett, 2009). Community pharmacies are situated in every locality and are often open up to 100 hours a week giving patients free and easy access to a healthcare professional without the need to wait for an appointment; however, they are widely thought to be an underused resource as many patients often do not realise they can be a source of medicines information (Bennie, Dunlop Corcoran, Trundle, Mackay, & Akram, 2013).

In the British National Health Service (NHS) community, pharmacists are funded to provide patient-centred medicines optimisation services that could support patients with less well-controlled cancer pain. However, the sparse research in this area found that these services are rarely carried out with this patient group (Savage, Blenkinsopp, Closs, & Bennett, 2013). Medicine optimisation services currently available in community pharmacies in England and Wales include the Medicines Use Review (MUR) and the New Medicine Service (NMS). MURs are consultations with patients where all patient medication is discussed and explained and often issues around concordance, compliance and supply are addressed. NMS concentrates on newly prescribed medicines and involves two consultations (usually by telephone) to ensure medicines are started and no side effects or problems ensue. There is RCT evidence that NMS detects adverse effects from medicines, positively influences prescribing and improves treatment adherence (NMS Evaluation 2014). A recent review of the limited evidence relating to MUR concluded that "in line with their intended purpose, patient knowledge and self-reported adherence may improve following MURs" (Wright, 2016, p37).

Current policy allows community pharmacists to carry out MURs with patients living with cancer pain, but the NMS service can only be provided for patients being newly prescribed medicines for certain conditions; cancer and pain are not included (PSNC 2017). MURs are intended to be provided face-to-face when a patient is in the pharmacy unless permission is requested on an individual patient basis from NHS England (PSNC 2017). Patients with advanced cancer may not come into pharmacies and their medicines are often collected by relatives or supplied by delivery drivers (Savage et al., 2013).

Where medicines optimisation interventions have been carried out with patients suffering from cancer pain, there is evidence of benefit; systematic reviews of educational interventions for cancer pain (by any healthcare professional) found a reduction in average and worst pain intensity. Pharmacist educational interventions for patients with chronic pain showed a reduction in pain intensity, adverse events and an improvement in satisfaction with treatment (Bennett, Bagnall, et al., 2009, 2011). There are no systematic reviews of pharmacist interventions for cancer pain as very few studies have ever been carried out.

Community pharmacists are the health professional with whom patients with cancer pain have most frequent contact alongside palliative care nurses with 75% of patients having contact within a 2-week period (Bennett, Closs, & Chatwin, 2009).

Community pharmacists can currently access only limited information about their patients and they do not routinely know which of their patients have cancer. A previous study with community pharmacists found that little communication occurs between them and other healthcare professionals about the care of patients with cancer with pharmacists rarely finding out the diagnosis of the patients whose medicines they were dispensing (Savage et al., 2013). The introduction of Summary Care Record (SCR) access for community pharmacies in 2016 has improved information sharing but not all prescribing is recorded and diagnoses are rarely included (NHS Digital, 2017).

Research on community pharmacists' views about providing services for patients with cancer indicates a perceived lack of knowledge and need for training (O'Connor, Hewitt, & Tuffin, 2013; Savage et al., 2013). However, little research has investigated how patients with advanced cancer use community pharmacies and attitudes towards having medicines consultations.

What is known about this topic

- Pain in advanced cancer is often complex, rapidly changing and poorly controlled.
- Patients with cancer pain rarely access community pharmacy medicines consultation services.

What this paper adds

- Patients without access to specialist palliative care services appear to need more support with their pain medicines.
- Patients are open to the idea of medicines consultations with their community pharmacist in person or by telephone.
- There is concern that the addition of community pharmacists into the palliative care pathway could cause conflict between or duplication of services.

2 | AIMS

- To explore the views and experiences of patients with advanced cancer about community pharmacy and its services and the associated challenges they may face.

- To investigate the acceptability of community pharmacy medicines consultation services and find out what patients with cancer pain might need from such a service.

3 | METHOD

A qualitative method of semi-structured interviews was chosen as the study topic was complex and so far unexplored (Bowling, 1997). Following a review of the literature, the interview schedule was developed in line with the study aims. Topics included current interaction with pharmacy, services and experiences of them and views on potential future services (see Table S1). Interviews were semi-structured in design to ensure focus on the research aims while allowing in-depth discussion on points of interest. The interview was piloted with two patients and minor amendments to language were made.

This research is part of a wider programme which is a multidisciplinary body of work involving three Universities. Ethical permission was granted from the NHS Ethics committee.

3.1 | Sampling and recruitment

Purposive sampling was carried out to ensure focus on the views of patients experiencing pain from advanced cancer. The assumption was made that patients would have some involvement/contact with community pharmacies through dispensing of prescribed medicines.

The inclusion criteria for patients were:

- Aged over 16 years
- Have advanced cancer*, are aware of their diagnosis and are experiencing pain
- Have been prescribed a strong or moderate opioid for cancer pain within the last 3 months**
- Have not been prescribed anticipatory medicines and are not considered to be in the last days of life
- Have capacity to provide informed consent
- Have capacity to complete questionnaires before and after the medicines consultation.

*People with advanced cancer are those with metastatic cancer with histological, cytological or radial evidence and/or those receiving anti-cancer therapy with palliative intent.

**Strong and moderate opioids are codeine, codeine and paracetamol, codeine and ibuprofen, dihydrocodeine, paracetamol and hydrocodeine, tramadol, tapentadol, morphine, fentanyl, buprenorphine, diamorphine, hydromorphone, methadone and oxycodone.

Patients were recruited from GP practices in one area of England between January 2015 and July 2016 to take part in an interview with a researcher. Research-ready practices which employed a practice pharmacist were selected from areas of differing deprivation scores within the area to represent the wider population (Open Data Communities 2015). The researcher was not allowed direct access to the practice clinical information system so practice pharmacists carried out searches. Letters of invitation were sent to the practice manager, with telephone follow-up by researcher 1 and meetings were arranged to discuss the research where the practice wished to do so. Twenty-one surgeries were invited to take part and 16 agreed to do so.

Each practice pharmacist carried out a pre-designed search of the practice clinical information system to identify patients who had any cancer code attached to their record. The practice pharmacist then individually searched the patients' record to check whether their cancer code was current and they had advanced cancer.

For those patients identified as being potentially eligible to take part, a task was sent to their GP to ask whether they were suitable for inclusion in the study, i.e. they had capacity to provide informed consent and had not deteriorated since the search. A letter of invitation, participation information sheet and consent form were then posted from the surgery including details of the research pharmacist, why the research was being carried out and what would happen. Completed consent forms were returned to the research pharmacist at the university. Reminders were not sent as the health of this patient group is likely to change rapidly leading to changes in eligibility.

The target sample size was 15 patients or when data saturation was reached (Fusch & Lawrence, 2015; Malterud, Siersma, & Guassora, 2016).

3.2 | Data collection

The interview guide was developed using the aims of the study and is available as a supplement to this paper (Table S1). Participants were given the choice as to where they would like the interview to be carried out and were asked if they would like to have a family member or carer present with them during the interview. The research pharmacist carried out the majority of interviews with a second researcher helping when the research pharmacist was unavailable. Although the research pharmacist had limited experience of interviewing, they had extensive consultation experience and were supported by a highly experienced research lead and wider group. Following each interview the researcher carrying out the interview wrote reflective field notes to support analysis. Patients were recruited and interviewed until two interviews after no new themes emerged, at which point it was concluded that data saturation had occurred (Fusch & Lawrence, 2015).

3.3 | Data analysis

Interviews were audio-recorded and transcribed verbatim before being analysed using thematic Framework analysis by the research pharmacist (Ritchie & Lewis, 2003). This method was chosen as it allows analysis across participants leading to the development of meaningful themes while still allowing the context of each individual taking part (Gale, Heath, Cameron, Rashid, & Redwood, 2013; Smith & Firth, 2011). A combined approach of inductive and deductive analysis was used. We were interested in pharmacy use in patients

TABLE 1 Patient characteristics

Patient	Gender	Age years	Deprivation score of postcode[a]	Employment status	Social circumstances	Community pharmacy use	Under specialist palliative care services	Awareness or experience of community pharmacy medicines consultation services
S1P1[b]	F	89	6	Retired	Lives alone	Regular	No	No
S1P2[b]	M	68	6	Retired	Lives with partner	Regular	No	Yes
S1P3	M	81	6	Retired	Lives with partner	Regular	No	Yes
S2P1	M	61	2	Employed Off sick	Lives alone	Regular	No	No
S5P1	M	68	10	Employed	Lives alone	Regular	Yes	Yes
S5P2	M	70	10	Retired	Lives with partner	Regular	Yes	No
S5P3	M	82	10	Retired	Family staying	Regular	Yes	Yes
S5P4	M	52	10	Employed Off sick	Lives with family	Regular	Yes	No
S7P1	M	50	4	Unemployed	Lives alone	Regular	No	Yes
S8P1	M	58	10	Retired	Lives with partner	Regular	Yes[c]	Yes
S10P1	M	77	6	Retired	Lives with partner	Regular	Yes	Yes
S13P1	F	55	6	Employed	Lives with family	Regular	No	No
S13P2	F	40	6	Employed Off sick	Lives with family	Regular	Yes	No

[a] Deprivation scores where 1 is the most deprived centile and 10 is the least (Open Data Communities 2015).

[b] Interviews carried out by MA. All other carried out by ZE.

[c] In regular contact with Hospital ward nurses.

with cancer pain; however, we wanted the qualitative interview data to inform our themes and allow unexpected findings to be explored (Gale et al., 2013).

Interview transcripts were read and re-read by researcher 1 and researcher 2 to gain familiarity alongside field notes from both researchers (researchers 1 and 3) following which a framework was developed. The framework was then applied to the data. Data were then sorted into similar concepts before being summarised. Descriptive categories were then allocated and refined by researcher 1, 2 and 4 several times until the authors were satisfied with the themes and sub-themes assigned.

In the Results section which follows the verbatim quotations from participants are coded using a site-code (S) and a patient number code (P). C corresponds to a carer or family member who was involved in the interview.

4 | FINDINGS

In total 121 patients were identified from searches of GP clinical information systems and subsequent individual review of notes. GPs assessed 73 patients were suitable for invitation and were sent an invitation pack.

Thirteen patients returned a completed consent form and agreed to be interviewed (from 7 of the 16 surgeries) and all requested the interview to take place in their own home. Patients were aged between 40 and 89 years old; 10 were male and 3 were female and they lived in areas with deprivation scores of between 2 and 10 (Open Data Communities 2015). Interviews lasted between 27 and 51 min and none were repeated. Saturation of themes was apparent after the eleventh interview. Table 1 summarises key characteristics of the patients in the study. Three patients were interviewed in the presence of family members who also contributed to the discussion.

Interview findings

Ten sub-themes were identified from the analysis (between two and three per theme) (Figure 1).

4.1 | Pain Management (Box 1)

4.1.1 | Adequacy of pain control

Pain levels and reported adequacy of pain control varied considerably among the patients. Those receiving specialist palliative care appeared to be more comfortable with how to manage their pain and who to turn to for help. They explained how their medication could be changed in a timely manner in response to changing needs.

The patients who were not receiving specialist palliative care services seemed to have pain that was less well controlled.

4.1.2 | Knowledge of medicines

Some patients were very knowledgeable about their pain medicines, while others appeared to know little and voiced a need for more information that could give them practical advice on how to get the best from their medicines.

Some patients did not realise that they had insufficient knowledge to be able to use their medicines to manage their pain and were unsure of which medicine was being used for which symptom. One patient did not know what their MST (morphine sulphate prolonged release) tablets were for. It seems unlikely that this patient would be able to adequately control their fluctuating pain levels with regular and top-up medication without a better understanding of their purpose.

4.1.3 | Experimentation with medicines

Experimentation through reducing the dosage taken was sometimes in response to concerns over addiction and tolerance (where a patient believed that the medicine might become less effective if taken over a period of time). Some patients were uncomfortable with their "tablet burden" and wanted to reduce medicine taking to the lowest possible level that would still control symptoms.

Occasionally professionals were reported to have been dismissive of patients' fears and anxieties, leading to patients not seeking further advice from them. One patient had tried to voice their concerns about taking too much pain medication to their healthcare professional and went on to reduce their medicine taking on their own.

FIGURE 1 Summary of themes and sub-themes found in qualitative interviews with patients suffering from advanced cancer exploring use of pharmacy and its services

BOX 1 Pain management

Adequacy of control

…if the pain gets more severe, I'll ring [the Macmillan nurse] up and say I can't go on like this! [The nurse says] ok, we'll talk to the doctor, increase the dosage of the patch. (S10P1)

Every day up to a point… there's something, some pain somewhere … they've referred me somewhere. Don't know where. (S7P1)

Knowledge of medicines

I just wish sometimes that there'd be a little sheet really almost that sort of said you know do this, do that. (S13P1)

So you take MST as well? Interviewer

That's it yeah … Is that a painkiller? (S1P1)

Experimentation

I'm always experimenting actually … I don't know if that's a good thing or not. (S13P1)

[The doctor said] we can see that … there isn't a right lot we can do about it, you know you just have to [take them]. (S8P1)

4.2 | Experiences and Expectations (Box 2)

4.2.1 | Community pharmacies

All patients interviewed reported using one regular community pharmacy (one, also additionally used a hospital pharmacy regularly at outpatient visits for specially prescribed treatment). Pharmacy location was important, sometimes through convenience and the pharmacy's proximity to the patient's GP surgery. Some patients talked about a preference for independent pharmacies rather than chains.

One patient had limited mobility and spoke about having to leave plenty of time to walk to the bus stop before catching the bus to the GP surgery. Using the pharmacy next to the surgery made their life much easier.

Service was also an important factor for patients in choosing which community pharmacy to use and several patients had changed pharmacies after repeated perceptions of poor service.

In contrast some patients described having "good relationships" with their community pharmacy team. Examples of how these relationships manifested themselves were where pharmacy staff knew the patient's name or were reported to have gone "above and beyond" what might be expected from them.

Patients felt that occasional problems with pharmacies such as mistakes or stock issues could sometimes be forgiven if they perceived the staff to be friendly and trying their best.

The positive experiences were not without exception and lack of relationship rather than a negative relationship was expressed.

Patients seemed to value more than just the basic level of service from their community pharmacy and wanted to be treated with friendliness by staff who knew them. This attribute positively influences the continuity of pharmacy use.

4.2.2 | Hierarchy of professionals

Patients perceived a hierarchy of professionals with whom they came into contact in primary care depending on who was involved and the stage in their cancer journey they were at (e.g. diagnosis, treatment, non-treatment and palliative care). Those patients who were under the care of specialist palliative care services would, without exception, always refer any problem to them.

One patient believed the specialist palliative care nurse had more expertise about cancer than GPs as well as dealing with cancer pain on a day-to-day basis.

The GP was viewed as second in line to go to for advice, or first in line if the patient did not have access to palliative care advice.

The community pharmacist was mentioned by one patient as being an option for advice.

One patient who reported positive experience of clinical interventions questioned the capability of community pharmacists to provide advice as they may have less knowledge about medicines than doctors.

4.2.3 | Support for medicines taking

Patients were introduced to the idea of a community pharmacy medicines consultation to support medicines taking. Although seven patients were aware of community pharmacy services, only three had experience of them and none of these had been since their cancer diagnosis.

The need for support was felt more by those were not receiving palliative care services and therefore did not have direct access to advice from palliative care professionals.

Patients were positive about the prospect of receiving community pharmacy services to help with their medicines use but many saw that as being the role of their GP.

The patients described how their medicines and doses had changed over time, making support after a medicine is prescribed—important and useful.

4.3 | Access to Care (Box 3)

4.3.1 | Resilience and responsibility

Patients talked about problems they experienced with managing supplies of their medicines and strategies they used either at the time or developed following an incident to prevent it happening again.

Early ordering of prescriptions to allow the pharmacy time to order items not in stock was a common way to prevent a patient from running out of medicines.

BOX 2 Expectations and experiences

Community pharmacies

It's our local pharmacy because it's the nearest … and it's right next to the GP. So if the GP gives you a prescription … you just pop into the pharmacy next door. Its … the whole experience of supporting your local community … rather than a big chain. (S5P4)

[The pharmacy] is directly opposite the doctors it's the easiest one … I get my prescription then I can just walk over and get it there. (S7P1)

[the other pharmacy] didn't seem to like over stocking so it was always having to go back for the owing note … it was also the unfriendliness of the staff. (S5P2)

They're lovely … I erm got there to pick my medication up and one of the pharmacists, he says are you alright? I says no I'm not so I told him what my problem was. He says have you a minute so I can talk about it and he sat down with me … they really are very nice. (S1P3C)

But they're smashing and I mean sometimes they do leave stuff off or forget stuff or whatever … but I mean they are really, really good I mean I've never had any bother with them. (S8P1)

They're not rude but at the same time they're not overly friendly. (S13P2)

Hierarchy

I don't see the doctor … I deal with the Macmillan Nurse … [they] visit me regularly erm I've no doubt I'll be seeing [them] next week, [they] just phone up and ask if it's ok to come along er, I just can't fault [them]. (S5P2)

Before you were in touch with [the palliative care nurse], was there anyone else you'd speak to? Interviewer

Straight to the doctor (640) (S10P1)

If I couldn't get into the doctor I'd ring the pharmacy. (S1P3)

Because they can be very helpful can the pharmacists but they might not, I mean they aren't qualified doctors so they might just give you something thinking they were very helpful and you might take it and it might upset the cart … (S1P1)

Support for medicines taking

If I were offered [a community pharmacy consultation] then I wouldn't take it up because I prefer to speak to my doctor … who knows more about me than anyone else. (S5P3)

Well [they] can't tell me about that, it's got to be my cancer specialist (nurse). (S2P1)

I was thinking that this week, thinking I'd really like to just talk to someone and say is it OK to just do this and take that every day once a day without taking Lansoprazole or is that going to really affect my stomach, you know it's like I don't know the answer to that so there's lots of questions around it. (S13P1)

I'm just still in a lot of pain. (S7P1)

What do you do when that happens? Who do you talk to? Interviewer

Erm, I just sort of struggle through. (S7P1)

I think that's a good idea … and it would be good to review that occasionally. But I thought that would be done by the doctor who is, is treating you. (S5P4)

It's quite a good idea … especially with the cancer medication and they do have a lot of side effects and sometimes even if they discuss the side effects … when you're experiencing the side effects, you do wonder [should it really be] as bad as this? (S13P2)

When a patient was seen by a doctor outside of usual working hours, this posed particular challenges. One patient explained about a time they had been given a prescription for emergency painkillers at 2 a.m. and there was no community pharmacy open where it could be dispensed.

The prescribing doctor was not able to suggest a solution, and it was only afterwards that the patient thought of a different way that they might have been able to get the medicine.

4.3.2 | Alternative methods to access/contact healthcare professionals

Patients were familiar with contacting healthcare professionals by telephone and many described ordering medication by phone or ringing community pharmacies with queries. Most patients would accept medicines consultations with their pharmacist by telephone, and some thought that this method would be easier due to mobility problems or trying to fit in multiple health appointments around other commitments.

Some patients preferred face-to-face contact with a healthcare professional and one raised potential communication difficulties which may occur with telephone conversations.

Patients were also asked how they felt about the possibility of using electronic devices (computers, smartphones, etc.) to access healthcare professionals using tools such as Skype or Facetime. Four patients responded positively; however, most of the patients voiced their lack of access to computers or computer literacy as reasons for not wanting access in this form (Table 2).

BOX 3 Access to care

Resilience and responsibility

If I was very late with any prescription it was usually [the pharmacy's] delivery that was [the problem]. It wasn't [the pharmacist's] fault, do you know what I mean. Yeah so I worked it so I was ordering like a week to two weeks before I actually needed it. (S5P1)

The pain was so bad, excruciating and at that time we couldn't get hold of any medication. Went to [two neighbouring towns]. (The prescriber) said [they, they didn't] think there are any pharmacies open … I think you know in hindsight I think I should have just gone to A & E because that's so bad, because you know the pain was so bad I think, nobody believed me that it was so bad. (S13P2)

Alternative methods to access/contact healthcare professionals

Talking about a community pharmacy consultation But then what I'm thinking is then it's another drive, it's another appointment, it's another appointment to deal with is what I'm thinking. (S13P1)

What about if it was done by telephone? Interviewer

Yeah, that would be alright … I really wouldn't want to have to drive to another appointment. You know it's bad enough fitting everything in as it is really around working and living. (S13P1)

I would very much prefer face-to-face contact … Em over the phone is possible as well but the medication… is, it's, it's … they all have these fancy names and you need to have to, you can't remember it! … But em … you need to be very organised and have a list and have it all written down and pronounce them all correctly and stuff. (S5P4)

I haven't got a computer and I don't want one. (S1P1)

We're not that technical … we'd rather just go and talk to somebody. (S1P2)

4.4 | Communication (Box 4)

4.4.1 | Conflict and duplication

The patients in this study were receiving care from many healthcare professionals and described how they sometimes received conflicting messages.

Where a patient thought they had access to sufficient advice about pain medicines, the involvement of an extra person such as the community pharmacist was seen as having potential to introduce further conflicting advice.

4.4.2 | Patient-centred communication

When talking about communication between healthcare professionals, one patient was surprised to learn their community pharmacist did not have access to their records as their perception was that they were a "safety-net" where all their medicines from different sources were collated and checked. There was an assumption that communication between the different professionals and across care transitions occurred more than it did in reality.

5 | DISCUSSION

This study explored patients' perspectives about community pharmacy services in the context of pain management in advanced cancer. Our findings confirm those of other studies that there is unmet need for additional medicines support for some patients (and their carers) during pain management in palliative care in cancer (Adam et al., 2015; Bennett, Bagnall, et al., 2009; Closs et al., 2009; Latter, Hopkinson, Richardson, Hughes, & Edwards, 2016). Similar numbers of patients in this study were receiving and not receiving specialist palliative care services therefore allowing insight into the needs, experiences and perceptions of both groups.

To our knowledge this study is the first to explore continuity of pharmacy use and the only to explore use by patients with advanced

TABLE 2 Patients' ownership of technology and acceptability of different methods of service provision

Patient	Use of computer	Acceptability of telephone consultation	Acceptability of Skype consultation
S1P1	Not owned	Acceptable	No access
S1P2	Owned	Prefers face-to face	Lacks technical ability
S1P3	Owned	Acceptable	Lacks technical ability
S2P1	Owned	Acceptable	Not acceptable
S5P1	Owned	Acceptable	Not acceptable
S5P2	Owned	Acceptable	Not acceptable
S5P3	Not disclosed	Not acceptable	Not acceptable
S5P4	Owned	Prefers face-to-face	Acceptable
S7P1	Not disclosed	Acceptable	Not disclosed
S8P1	Owned	Acceptable	Acceptable
S10P1	Owned	Acceptable	Acceptable
S13P1	Owned	Acceptable	Acceptable
S13P2	Owned	Acceptable	Not acceptable

cancer. Patients' views of their community pharmacies varied and most used them only for medicine supplies and occasional advice. Few were aware of medicines consultation services and even fewer had used them. This finding supported previous research which found that pharmacists reported rarely carrying out medicines consultations with this patient group (Savage et al., 2013). Patients provided little evidence of a "clinical" relationship with their community pharmacist. Instead patients spoke mainly about what they perceived as "good" service and many had changed pharmacies in the past to obtain the service they wanted occasionally accepting a trade-off where friendly staff were perceived to compensate for inadequacies in reliability and accuracy of medicines supply. Interestingly, all participants had a regular community pharmacy and the choice of this was based on service, location and for some whether it was an independent business or not.

BOX 4 Communication

Conflict and Duplication

....trying one thing after another and it isn't working, they've been doing it for years and it isn't working and being told that there isn't an operation they can do to cure it but my GP says there is. (S1P2)

I don't like conflicts ... I don't want different people telling me different things ... I'm really happy with the Macmillan nurse – I don't want somebody saying [they are] wrong. (S5P2)

Patient-centred communication

The hospitals usually send a letter to your GP don't they? I don't suppose they do that with the pharmacy ... ask for it or whatever to be sort of emailed over to them. (S7P1)

So if you have been prescribed something in hospital and pick it up from [the] pharmacy, (the community pharmacy) wouldn't even know about it? That's not good! ... But there might be some, some erm ... interference or interaction between this new medication and the long list of stuff that you're already [taking]. (S5P4)

While most patients regarded their pharmacist in a positive light and some quoted occasions where the pharmacist made clinical contributions to their care, the pharmacist's knowledge about cancer pain and their place in the preferred order of who to contact was low. Patients perceived the need for not only medicines knowledge but also specialised clinical knowledge about their specific cancer and access to their medical history. The ideal support seemed to be in the form of a specialist palliative care nurse who had a combination of knowledge and expertise relating to both medicines and cancer along with access to their medical history. General practitioners were next followed by the community pharmacist. This is in line with findings from a previous knowledge-based study where nurses were found to know the most, followed by GPs and pharmacists with regard to pain assessment in palliative care (Furstenburg et al., 1998). Several other studies have also demonstrated a need for further pharmacist training in palliative care knowledge and issues surrounding difficult conversations (Borgsteede, Rhodius, Pasman, Onwuteaka-Philipsen, & Rurup, 2011; Hussainy et al., 2006; O'Connor et al., 2013; Savage et al., 2013). Where pharmacists have been trained to provide community palliative care services in Scotland, healthcare professionals saw them as their "first port of call" for information about palliative medicines (Akram, Dunlop Corcoran, MacRobbie, Harrington, & Bennie, 2017).

Although this is a small study, the findings indicate that patients who are not receiving specialist palliative care seem less able to gain optimal use from their pain medicines and have no timely access to advice in times of worsening symptoms or crisis. This is supported by the Voices survey where only 18% of patients in community settings were likely to describe their pain as being completely controlled compared with 38% in hospital and 68% in hospice environments (VOICES National Survey of Bereaved People, 2014). Referral to palliative care is known to happen relatively late in the journey of a terminal cancer patient and one-third of patients who die from cancer never receive specialist palliative care services (Ziegler et al., 2017). The idea of resilience of the patient to cope with problems has been found in other disease areas, not just palliative care (Fylan, Armitage, Naylor, & Blenkinsopp, 2017). Of course, not all patients want to be referred to specialist palliative care or indeed, have the opportunity to be. Therefore, a need exists for medicines support either before that referral occurs or for patients who stay under the care of their GP.

Most patients found the idea of a community pharmacy medicines consultation acceptable whether face-to-face or by telephone. Patients felt that this would be of most value early on in the cancer pain journey and before the involvement of specialist services. Patients were generally uncomfortable with the idea of medicines consultations being carried out via Skype as there was a lack of access to equipment or unfamiliarity with technology. Patients were more positive about medicines consultations being conducted by phone and found the idea of this less burdensome in terms of travel and time than a face-to-face consultation. Telephone-based consultations are now carried out on a routine basis with palliative care patients in another area of West Yorkshire (Middleton-Green et al., 2016). There was a gap between the theoretical acceptability and the likelihood of actually using a medicines consultation service in the future.

Patients' need to experiment with their medication to try and achieve pain relief at the lowest possible dose was evident and this could be helped by educational interventions to either optimise the medicines they have already been prescribed, allay any fears or stigma surrounding the use of strong painkillers or to refer to prescribers for a dose change. This is backed up by previous research which found an improvement in pain scores for patients with cancer pain who received educational interventions (Bennett, Bagnall et al., 2009).

6 | STRENGTHS AND LIMITATIONS

We encountered challenges with recruitment mainly due to potential participants being too unwell to participate and therefore views of patients with very advanced disease are not included.

The study was conducted across a single UK city with a diverse socioeconomic population; however, we recognise the findings may not be transferable to other parts of the UK.

While the average age of participants was 64 years old and the majority were male, there is evidence that older patients do not experience cancer pain differently although there is evidence to suggest that there are gender differences in healthcare utilisation (Bennett, Closs et al., 2009; Wang, Hunt, Nazareth, Freemantle, & Peterson, 2013).

The interviewer was a research pharmacist and their professional background was shared with the participants and potentially influencing the views expressed with a degree of participant eagerness to please and say the "right thing" and paint community pharmacy in a positive light (Jack, 2008). Conversely the background of the researcher aided understanding of issues throughout the interviews and therefore they acted as an "embedded researcher" (Vindola-Padros 2015). Reflexivity was practised by the researcher throughout.

At the beginning of the interview process, researchers were unaware of all important issues for the patients with regard access to equipment. This unfortunately led to a small amount of missing data for computer ownership. We feel that as this was the case with such a small number of participants, it does not devalue our findings.

Any qualitative study relies on the interpretation of the data and this may affect the reliability of the results. In the current study, this was mitigated by the involvement of other research team members in discussions about coding and during the write-up of results.

7 | IMPLICATIONS OF THE STUDY

Our findings have implications for practice, policy and research. The most effective use of a community pharmacy medicines consultation appears to be for patients who are not receiving specialist palliative care and the pharmacists need to be appropriately trained in both theory and consultation skills to provide such a service. The development of referral pathways to identify these patients is a necessary next step and a pathway from community pharmacy to palliative care could be usefully explored. Based on the findings of the study reported here, we have delivered NMS style consultations by telephone to patients with pain from advanced cancer and the results could inform future policy discussions. It is vital that any new service is designed with the needs of the patients in mind and is accessible for all who need it. Our findings show a need for medicines support for some patients with pain from advanced cancer and that they are receptive to a telephone-based consultation with a healthcare professional.

8 | CONCLUSION

Patients experiencing pain from advanced cancer have complex and often changing medicine regimens which pose challenges in terms of management and optimisation. This study has shown that patients have unmet needs and indicates that targeted community pharmacist input from highly trained pharmacists as a potential information source for patients is worthy of further research. There is a need for medicines support for patients who have not yet been, or may not be referred to specialist palliative care. Patients receiving care from specialist palliative care nurses valued their expertise and saw them as the first port of call for advice about pain medicines. Patients were receptive to the idea of a medicines consultation with a community pharmacist and were positive about this being carried out in a face-to-face setting or by telephone. Widening access to telephone medicines consultations could contribute to improving access to pain medicines support in advanced cancer.

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CONFLICT OF INTERESTS

All authors declare no competing interests.

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SUPPORTING INFORMATION

Additional Supporting Information may be found online in the supporting information tab for this article.

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Appendix 2

Paper 2

Pharmacist educational interventions for cancer pain management: a systematic review and meta-analysis

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Pharmacist educational interventions for cancer pain management: a systematic review and meta-analysis.

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Authorship – Literature searching was assisted by AC and the paper was drafted by ZE with methodological and procedural input from CC and LZ. It was then critically revised by AB and MB. ZE, CC, LZ, AB and MB all made a substantial contribution to the design of the review and the interpretation of the data and approved the paper for publication.

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Ethical Review – this systematic review and meta-analysis does not require ethical review as it is using previously published and anonymised data.

Abstract

Objectives

Educational interventions by pharmacists for patients with cancer pain aim to improve pain management, but little is known about the different components of interventions and their effectiveness. Our aim was to assess the benefit of pharmacist delivered educational interventions for patients with cancer pain. A systematic review and meta-analysis of experimental trials testing pharmacist delivered educational interventions for cancer pain was carried out to identify the components of interventions and effectiveness at improving pain related outcomes for patients with cancer.

Methods

A literature review was conducted in EMBASE, MEDLINE, CINAHL, PsycINFO, ASSIA, Web of Science and CENTRAL from inception until January 2018 searching for educational interventions involving a pharmacist for patients with cancer pain. Four studies were included involving 944 patients. Metaanalysis was carried out where possible.

Key findings

Meta-analysis of three of the four studies found that mean pain intensity in the intervention group was reduced by 0.76 on a 0-10 scale (95% confidence interval), although only two of the studies used validated measures of pain. Improvements in knowledge, side effects and patient satisfaction were seen although with less reliable measures.

Conclusions

Pharmacist educational interventions for patients with cancer pain have been found to show promise in reducing pain intensity. Studies were few and of varying quality. Further, good quality studies should be carried out in this area and these should be comprehensively reported. Trials measuring patient self-efficacy and patient satisfaction are needed before the impact of the pharmacist delivered interventions on these outcomes can be established.

Keywords

Educational intervention, medicines optimisation, pharmacist, pain, cancer.

Introduction

Cancer is one of the leading causes of death worldwide. In the UK, there were around 357,000 newly diagnosed cases of cancer and 163,000 cancer deaths in 2014[1]. Life expectancy of people living with cancer patients is increasing and in the last 40 years, the cancer survival[1] rate in the UK has doubled, from 24% to 50% [1].

The World Health Organisation's analgesic three-step ladder is the clinical principle for cancer pain management [2]. It has been used since it was first published in 1986, and it involves a stepwise approach to analgesic prescriptions for cancer pain with non-opioid analgesics for mild pain, weak opioids for moderate pain, and strong opioids for severe pain [3, 4]. Despite the improvement recorded in pain management after using this strategy, evidence indicates that patients living with cancer still experience high levels of pain in situations where it is possible to reduce their suffering [5, 6]. It has been reported that around 25% to 33% of patients living with cancer are receiving insufficient pain management [7, 8]. In addition, two systematic reviews that assessed the quality of pain management in adult patients with cancer revealed modest improvements in pain management, but stated that one third of patients who experience pain continue to be under-treated [9, 10].

Only 18% of patients living in community settings describe their pain as controlled at the end of life compared with 38% and 68% in hospital and hospice settings respectively [11]. The pain experienced can often change rapidly with disease progression and patients have voiced a need for additional support with pain at the end of life [12, 13].

Pain from cancer can be complex. Nociceptive visceral or somatic pain can be caused by the tumour itself and neuropathic pain can be due to treatment.

An educational intervention can be defined as information, behavioural instructions or advice and can be delivered to patients, in this case, with cancer pain, by means of verbal, written, audio- or video-taped or computer aided methods [14].

Educational interventions have been shown to help patients with cancer pain by both improving knowledge and reducing average and worst pain intensity [14]. Mechanisms for this

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[1] People who are diagnosed with cancer and survive their disease http://www.cancerresearchuk.org/health-professional/cancer-statistics#heading-Two .

include the positive link between patient knowledge about medicines and adherence to them as well as an association between reduction of barriers to pain relief and adherence [15, 16]. Low adherence to medication has been linked to reduced pain control [17]. A British study found that 61% of patients said they had a significant need for further information about their medicines ten days after it had been prescribed and 25% were non-adherent to medication after four weeks [18].

Community pharmacists in the UK are the most frequently accessed healthcare professional for patients with advanced cancer (along with community nurses) [19]. Community pharmacies are situated in every locality, often opening for extended hours and already offer medicines optimisation services on a walk-in basis for patients. Pharmacists also work in hospitals, family doctor practices, hospices and for external provider organisations all of which could provide a source of medicines advice for a patient with cancer pain. Increasingly, pharmacists are taking on more patient-facing roles including vaccinations, blood testing and symptom management clinics including pain.

Pharmacist interventions for chronic pain have been found to reduce pain and adverse effects however few studies looking at educational interventions by pharmacists for patients with cancer pain have been carried out and this is the first systematic review to be published in this area [20, 21]. There are several systematic reviews focusing on educational interventions by any healthcare professional for patients with cancer pain and these have all found a small reduction in pain intensity in intervention groups [14, 22-24].

We hypothesize that educational interventions by pharmacists for patients with cancer pain might improve pain-related outcomes.

Methods

Search Strategy

We searched the electronic databases EMBASE, MEDLINE, CINAHL, PsycINFO, ASSIA, Web of Science and CENTRAL from inception until January 2018. Reference lists were also screened from papers retrieved. The search strategy is detailed in Appendix 1 and was adapted to meet the needs of each individual database searched.

Initial searches were carried out by ZE and AC and screening of titles and abstracts by ZE. After duplicates were removed the resulting studies were screened by ZE and CC independently and any disagreement was resolved by discussion and consensus.

Eligibility criteria

Studies were included if the following inclusion criteria were met**:**

- Experimental design studies with randomisation against a comparator.
- Reported in English or had an English translation.
- Delivery of any sort of educational intervention (this may have occurred as part of a larger more complex multidisciplinary intervention) by a pharmacist.
- Any setting (home, hospital, primary care etc.).
- Patients were adults with pain from ongoing active cancer of any kind, stage or site.

Studies were included if they had the following outcome measures. Primary outcome measures:

1. Pain (e.g. self-reported pain intensity expressed on a visual analogue (VAS) or numerical rating (NRS) scale.
2. Patient knowledge, beliefs, attitudes and behaviours
3. Self-efficacy and adherence to medication Secondary outcomes measures:
4. Patient satisfaction
5. Resolution or reduced risk of side effects or drug interactions
6. Reduced interference from pain in daily activities e.g. functional status or cancer pain specific functional status, social interactions, sleep, quality of life, mood.

Data extraction and reporting

Data was extracted independently by ZE and CC onto a standardised form.

Data was recorded on the following outcomes: knowledge, pain, self-efficacy, side effects, patient satisfaction and quality of life.

Data analysis

The findings of each study with equivalent outcome measures were inputted into RevMan (version

5.3) and meta-analysis was carried out. Other outcome measures were assessed qualitatively. **Quality assessment**

Studies were assessed for quality using the Cochrane tool for assessing bias [25]. The tool identifies bias related to the design, conduct, analysis or reporting of the study and helps identify methodological flaws within each study and whether the risk of bias is high, low or unclear. It was decided to use this tool due to its comprehensive nature and clear reporting [25].

Results

In total 989 studies were identified using the database searches, 953 of which were excluded after screening of the titles or abstract (see Figure 1 for flow diagram of study selection). When duplicates (18) were removed, full text screening of 18 individual papers was conducted. After 14 of these were excluded according to eligibility criteria there were 4 unique study papers which met the inclusion criteria for the review.

Figure 1: A flow diagram of study selection for pharmacist educational interventions for patients with cancer pain

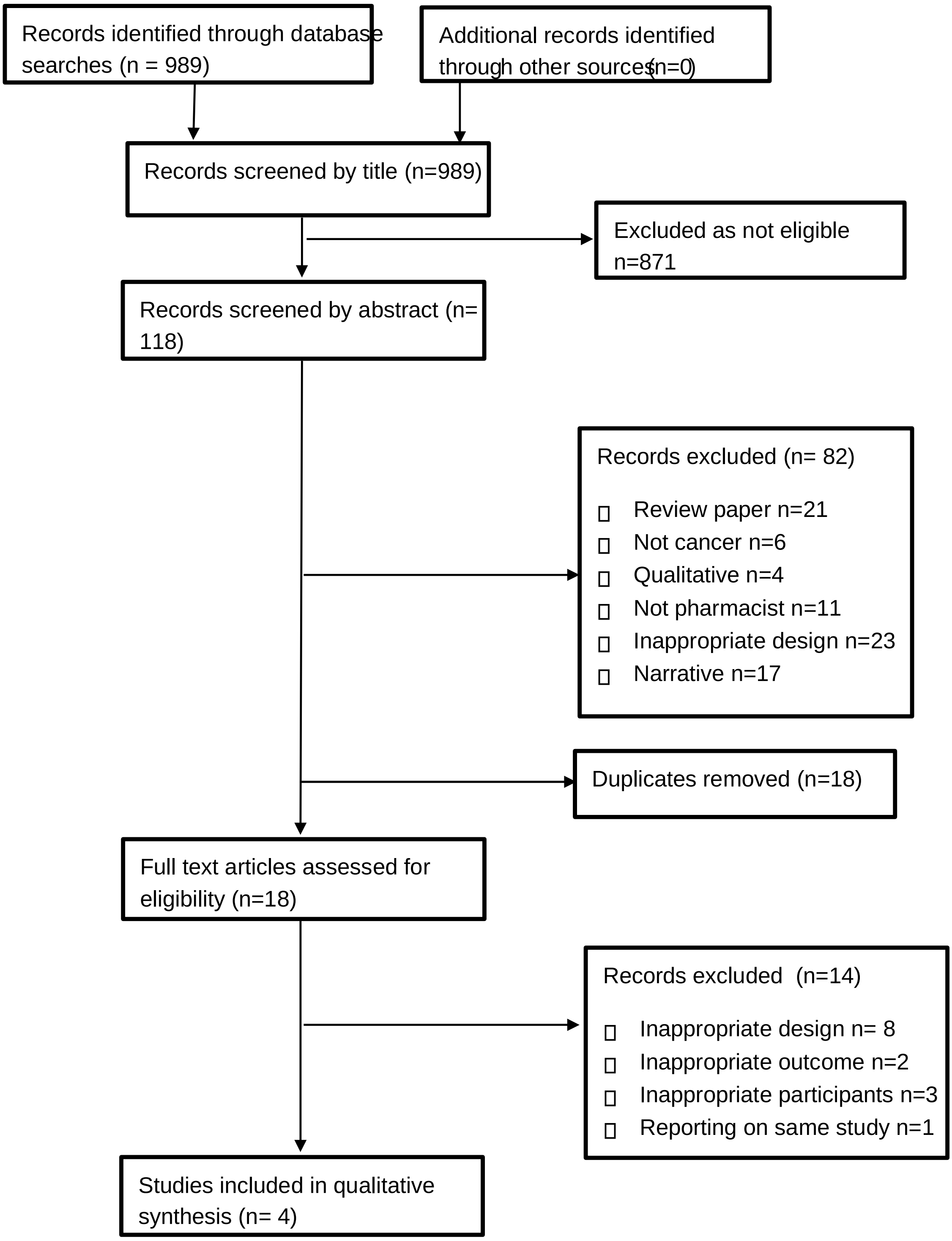

Table 1: Characteristics of included studies

Study	Sample recruited (completed)	Setting	Study design	Follow-up interval	Method of delivery	Dose or quantity intervention	Provision of written material	Pharmacist monitored pain scores	Medication review and adjustment	Findings
1.Powers 1983	16	Community	randomised pre-test/post-test experimental design	8 days	Pharmacist delivered consultations with dosage adjustment Recommendation of over-the counter medicines and supportive counselling	Daily telephone calls on days 2-7	No	Yes	Review and adjustment	Dosages lowered Improvement in pain scores Fewer side effects Increase in patient satisfaction
2. Wang 2013	237	Hospital and Community	RCT	4 weeks	Face-to-face counselling sessions by pharmacist	Eight 30 minute sessions over 4 weeks	Yes	Yes	Review and recommendations	Improvement in pain scores Increase in pain and analgesic knowledge

3. Chen 2013	542	Hospital and Community	prospective, multicentre, double arm controlled study	6 months	Assessment of pain control with counselling and liaising with prescriber	Weekly monitoring in hospital and twice a month consultations for six months	No	Yes	Review and recommendations	Standardisation of opioid administration Less frequent prescriptions Improvement in pain scores Increased quality of life Fewer side effects
4. Wang 2015	149	Hospital and Community	prospective randomised controlled study	2 months	Face-to-face counselling sessions	Two sessions a week for 2 months	Yes	No	Medication education	Quality of life increased Improvement in pain scores Increase in knowledge.

Characteristics of included studies are shown in table 1. The four studies included in the review involved a total of 944 participants (individual study populations ranged from 16 to 542). Three of the studies were carried out in China between 2013 and 2015 [26-28] and one in the UK from 1983 [29].

Settings were cross sector in all studies with three studies recruiting from the hospital in-patient population and continuing the interventions in the community [26-28] and one study recruiting from the hospital out-patient population [29]. All studies consisted of an educational intervention by a pharmacist, one involved dosage adjustment, non-prescription drug recommendation and supportive counselling [29], three involved a series of educational interventions [26-28] of which one involved liaison with the prescriber [26]. Consultations were entirely telephone based in one study [29] with a mixture of telephone and face-to-face in 3 studies [26-28] . The studies ranged from 6 [29] to 16 [28] consultations per patient in total. All studies compared the intervention with usual care.

Components of studies

The Chen et al (2014) study [26] involved a clinical pharmacist-led guidance team which comprised a trained pharmacist, oncology nurses, oncologists and administrators. Pharmacists without prescribing capability, were responsible for educating patients and staff about cancer pain therapy, monitoring medication use and medication drug responses. The team provided a pain consultation at the beginning to select the medicine and dose which was needed. This was then monitored weekly until the patient was discharged from hospital. Consultations were conducted with patients twice a month for six months where pain control and adverse events were assessed and dealt with. Additional communication with prescribers was carried out where any adjustment in medication was necessary. Usual care was described as having no guidance from the clinical pharmacist-led guidance team.

In the Powers (1983) study [29] , patients with chronic cancer pain who were suitable for pain relief by methadone received daily follow-up telephone consultations by the pharmacist after the medicine had been initiated to adjust the dosage, recommend other over-the-counter medicines and deal with side effects. Usual care involved customary medical care including instructions on the administration of methadone.

In the Wang (2013) study [27], patients in the intervention arm received written information and then eight 30 minute face-to-face counselling sessions to provide individualised pain control. Patients were able to contact the pharmacists when required and were able to request extra consultations if they were required. Pharmacists helped patients to complete questionnaires at study entry and after four weeks. The details of usual care were not explained; only that patients had conventional pain control.

In a later study by the same author [28] patients received written information followed by two 30 minute education sessions which were delivered twice a week for two months. Patients were assessed before and after the intervention for knowledge and quality of life. Usual care was described only as a routine medical service.

Quality of included studies

The quality of included studies is reported in table 2.

Table 2: Cochrane risk of bias summary [25][2]

Powers 1983	+	-	-	+	?	-	
Wang 2013	+	?	-	?	?	+	?
Chen 2014	-	-	-	?	-	+	
Wang 2015	+	-	-	?	+	?	
	Random sequence generation	Allocation concealment	Blinding of participants and personnel	Blinding of outcome assessment	Incomplete outcome data	Selective reporting	Other bias

Three studies [27-29] used adequate methods of randomisation and one study [26] was flawed in how the participants were assigned to the control or intervention groups. Methods of allocation concealment were not adequately discussed in papers and all were unclear, or bias was detected for this.

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[2] + denotes low risk
- denotes high risk
? denotes unclear risk

None of the participants were blinded as to the intervention as this is not possible in a study of this nature.

Outcome assessment blinding was not discussed in Wang (2013), Wang (2015) or Chen (2014) although Powers (1983) stated the pharmacist observer was blinded as to the group patients had been assigned which minimised assessment bias in this study.

Loss to follow-up was experienced in all studies. None of the authors used intention-to-treat analysis which could have been used to extrapolate findings.

Outcome data was poorly reported in the Chen [26] study. Patients were assigned to either the intervention or control group in order of registration into the study. Loss to follow-up was reported before this allocation making it unclear which group they had been allocated to. There is therefore a large risk of bias in the study. Data is unclear or incomplete in Wang (2013) [27] as 'other reasons' are reported for loss to follow-up. Powers [29] had a very small sample size (with no sample size calculation stated) making the outcome data less reliable. Wang (2015) [28] was assessed as no bias for this measure.

Selective reporting was found in Powers [29] as analysis was not fully described within each group.

Outcome measures

Studies in the review have several different outcome measures (see Table 3).

Table 3: A summary of the different outcome measures reported for the studies in this review

Table 3: A summary of the different outcome measures reported for the studies in this review

Powers 1983	**Wang 2013**	**Chen 2014**	**Wang 2015**
• Pain intensity • Pain relief • Number of side effects • Patient satisfaction	• Pain knowledge • Analgesic knowledge • Total pain related knowledge • BPI – Usual pain in the last week • BPI - Current pain • BPI – Pain at rest • BPI – Pain with movement • Pain interference – daily activity, mood, walking ability, normal working, relationships with others, sleep, enjoyment of life	• Opioid administration • Pain assessment before therapy • Dose titration before therapy, before slow release formulation, before dosage increase • Inappropriate conversion – change in drug without reason, incorrect conversion • Opioid – Morphine slow release, Oxycodone SY, Fentanyl patches • Pain score – bone, body, visceral and nerve • Quality of Life score • Gastrointestinal side effects –	• Knowledge • Attitude • Practice • Quality of life – Global, physical functioning, role functioning, emotional functioning, cognitive functioning, social functioning. • Symptom scales – fatigue, nausea and vomiting, pain, dyspnoea, changes in sleep, appetite loss, constipation, diarrhoea, financial difficulties.

		constipation, nausea, vomiting • Psychological problems – delirium, excess sedation, itchy skin, addiction • Patient feedback – familiarity with clinical pharmacist, how they contributed, satisfaction with outcome, would you request their help in the future.	

The large quantity of outcome measures used within the four studies contained some validated measures and some less objective measures.

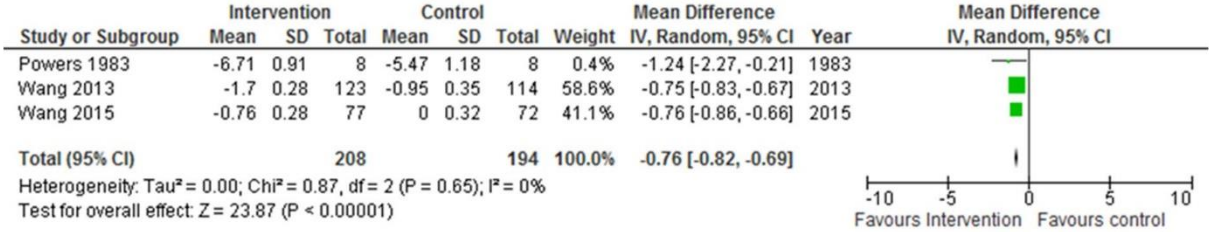
1. PAIN

All studies measured pain intensity in some form. The Chen [26] study measured using numeric or visual rating scales. Wang 2013 [27] used the Brief Pain Inventory which is a commonly used and validated assessment tool for measuring pain. Powers [29] also used a 0-10 scale but invited participants to place a cross on a 10cm line between 0-10. Wang 2015 [28] used the European

Organisation for Research and Treatment of Cancer Core Quality of Life Questionnaire (EORTC – QLQ-C30) which includes pain as a measure but using a 1-4 scale. This was then transferred to a 0-100 scale as part of their analysis.

All four studies showed a reduction in pain scores in the intervention group compared with the control. The Chen [26] study was not included in the meta-analysis as the measurement of pain was not comparable with the other three studies although pain was statistically significantly reduced in the intervention group in all pain sites measured.

Figure 2: Change in Pain Intensity



	Intervention			Control				Mean Difference	
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	Year
Powers 1983	-6.71	0.91	8	-5.47	1.18	8	0.4%	-1.24 [-2.27, -0.21]	1983
Wang 2013	-1.7	0.28	123	-0.95	0.35	114	58.6%	-0.75 [-0.83, -0.67]	2013
Wang 2015	-0.76	0.28	77	0	0.32	72	41.1%	-0.76 [-0.86, -0.66]	2015
Total (95% CI)			**208**			**194**	**100.0%**	**-0.76 [-0.82, -0.69]**	

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 0.87$, $df = 2$ ($P = 0.65$); $I^2 = 0\%$

Test for overall effect: $Z = 23.87$ ($P < 0.00001$)

Figure 2 shows the change in pain intensity using the three studies that used 0-10 scales (involving 402 participants). Overall the changes in pain intensity reduced by an extra 0.76 in the intervention group compared with the control group. This was significant at the 5% level and the overall 95% confidence interval suggests the change in pain intensity was reduced by an extra 0.69 to 0.82 points (on a 0-10 scale) in the intervention group compared with the control group. The I^2=0% suggest the studies are not heterogeneous, this is supported by the forest plot which shows studies found fairly consistent results. Though we used the random effects method, which is recommended when there is heterogeneity, using the random effects method would also be an acceptable method to use for all analysis, as long as there are sufficient numbers overall in the samples. This was probably the most appropriate method for us to use also given the differences in the study designs.

2. PATIENT KNOWLEDGE

Both Wang studies [27, 28] looked at patient knowledge of cancer pain before and following the intervention. Both studies found that knowledge increased post intervention in both groups although this was significantly higher in the intervention group at baseline for both studies. Knowledge was measured in Wang 2013 [27] through separate pain and analgesic questionnaires. The questionnaire used was reported as being developed by all authors however it is unclear whether recognised principles of good questionnaire design were used [30]. Questions consisted of poorly worded and leading statements with the purpose of determining a respondent’s knowledge about pain and analgesia with no mention of piloting the questionnaire with patients. The knowledge tested was not always useful for a patient with cancer pain although there may have been changes when the questionnaire was translated into English. The Wang 2015 [28] study questionnaire used a significant amount of technical medical language which patients may have found difficult to understand. It is unclear how useful an increase in this knowledge would be and any change could have been as a result of seeing the questions and investigating their meaning before the second questionnaire.

3. SELF-EFFICACY AND ADHERENCE TO MEDICATION

These were not measured in any of these studies.

4. PATIENT SATISFACTION

Powers [29] and Chen [26] both measured some aspect of patient satisfaction. Chen [26] asked a simple question at the end of the study about satisfaction with the outcome of the treatment which was slightly (but significantly) higher in the intervention group. In the Powers [29] study it is unclear how patient satisfaction was assessed other than by an observer at the end of the study. A substantial increase was seen in the patient satisfaction in the intervention group compared with a small reduction in the control group.

5. SIDE EFFECTS

Side effects were measured in some way in Chen [26], Powers [29] and Wang 2015 [28]. Chen [26] and Wang 2015 [28] broke side effects down into individual symptoms and measured changes over the course of the study. These are not directly comparable as data was collected in different ways but decreases in constipation, nausea and vomiting were seen in both studies. Other side effects collected in these two studies were not comparable. Powers [29] collected data on number of side effects which was found to decrease in the intervention group.

6. QUALITY OF LIFE (QOL)

Chen [26] and Wang 2015 [28] both measured QOL. Chen [26] used the validated European Organisation for Research and Treatment of Cancer Core Quality of Life Questionnaire (EORTC QLQ-C30) and found a significant increase in QOL in the intervention group post intervention. Wang 2015 [28] did not go into any detail about how QOL was measured and whether a validated tool was used but also found a significant increase in QOL.

Discussion

The review found that pharmacist educational interventions can have a positive effect for patients with cancer pain in relation to reduction in pain. The difference found in the meta-analysis was in line with that found in meta-analysis of educational interventions by any healthcare professional [14, 22-24]. Some evidence was also found that an improvement in knowledge, patient satisfaction, quality of life and a reduction in side effects can be demonstrated.

This systematic review is the first in this subject area and highlights the paucity of research available. Other studies have been conducted regarding educational interventions by pharmacists for patients with cancer, but these are non-experimental in nature [31-34].

Strengths and Limitations

Three of the four studies reviewed were from China [26-28] and one from UK [29]. The training of pharmacists in China is likely to be different compared with Europe and findings may not be generalizable across the world. The three Chinese studies [26-28] were published from 2013 onwards compared with the Powers [29] study which was published in 1983. The practice of pharmacists throughout the world has changed considerably since 1983 with increasingly more focus on additional medicines optimisation services.

The studies identified were assessed using the Cochrane tool and all were flawed with bias introduced in several ways for each study. Not all elements were clear in the reporting of methods or results and improvements could have been made to study design in all cases [25].

Although pain was assessed by the BPI or with another 0-10 scale with three of the four studies, other outcome measures were not measured in similar ways making comparison and meta-analysis difficult. The heterogeneity of pain measurement was problematic for meta-analysis and due to the necessary conversion of the Wang (2015) [28] data to a 0-10 scale this adds less reliability to our results. This perhaps demonstrates that research on this subject matter is in its infancy and would benefit from learning from educational intervention studies by other healthcare professionals where pain is measured by BPI. Side effects were all measured in different ways from number of side effects (Powers [29]) to changes in symptoms (Chen [26] and Wang 2015 [28]). An alternative way of measuring side effects would be through the Pharmaceutical Care Network Europe (PCNE) classification of drug-related problems [35]. This could be used to compare the problem, its cause, the intervention that followed and whether it was accepted by the physician or patient.

Other outcomes which could be used could focus on follow-up treatment and the number of healthcare consultations or new prescriptions in the time after the intervention. This would perhaps not be an accurate reflection of whether interventions were beneficial for the patient as more consultations or additional prescribing is not necessarily what at patient approaching the end-of-life needs.

The duration and intensity of the reported interventions varied considerably. Only two studies [27, 28] reported how long consultations had lasted (although quantities of consultations ranged from 6 per patient in the Powers [29] study to 16 per patient in the Wang 2015 [28] study. It might be assumed that more contact with a healthcare professional would provide greater benefit for the patient but more contact would also increase the burden on the patient [36, 37]. Finally, the small number of studies and the high risk of bias means the meta-analysis estimate of effect is likely to change with more and better quality studies.

Usual care was not fully described in any study and was lacking any detail in both Wang (2013) [27] and Wang (2015) [28]. It is unclear whether pharmacists were involved in the usual care given in any of the four studies. Usual care is difficult to define but the exact components of the control arm need to be known to differentiate it from the intervention, so this is a limitation of the review.

Recommendations for the future

Very few studies of an experimental nature have been carried out in this area to date. The further research clearly needed would benefit from using Medical Research Council guidance on complex intervention development [38]. Reporting of studies needs to be carried out in a clear and methodological manner to enable comparison and replication. Use of CONSORT and TIDieR guidelines would provide high quality and transparent reporting which would aid informed service design of future studies [39, 40].

Although a positive association was found between educational interventions by pharmacists and cancer pain, it is unclear what the active components of the interventions were. Interventions were all of a complex nature involving different amounts of patient contact over different periods of time, sometimes with additional written information.

There was no mention in any of the studies about any feasibility studies the interventions had been informed by and whether the fidelity of interventions had been assessed in any way. Future studies would benefit from evaluation to understand how the different components contributed to the outcomes achieved.

Conclusion

Our systematic review highlights the limited evidence base regarding educational interventions by pharmacists for patients with cancer pain. Although the analysis indicates that these interventions are beneficial and can lead to a reduction in pain intensity and improvements in knowledge, patient satisfaction and side effects, very few RCTs have been carried out. Future research should focus on generating high quality evidence in this area and ensuring it is reported clearly to allow learning and replication for the future. Outcome measures should be considered carefully to ensure potential benefits for patients can be measured and compared easily.

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Appendix 3

Paper 3

Evaluating recruitment methods of patients with advanced cancer: a pragmatic opportunistic comparison

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Evaluating recruitment methods of patients with advanced cancer: a pragmatic opportunistic comparison.

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Authorship

This paper was drafted by ZE and critically revised by MB, DP and AB. All authors made a substantial contribution to the design of the study and ZE, MB and AB to the interpretation of the data.

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Conflict of interests

All authors declare no competing interests

Abstract

Background: Recruitment of patients with advanced cancer into studies is challenging.

Objective: To evaluate recruitment methods in a study of pharmacist-led cancer pain medicines consultations and produce recommendations for future studies.

Method: Two methods of recruitment were employed: 1) community-based (general practitioner computer search, identification by general practitioner, community pharmacist or district nurse and hospital outpatient list search), and 2) hospice-based (in and outpatient list search). Patients identified in method 1 were invited by post and in method 2 were invited face-to-face. Information was designed in collaboration with patients and carers.

Results: 128 patients were identified (85 from the community and 43 from the hospice), 47 met the inclusion criteria. Twenty-three agreed to take part and 19 completed the study, 17 of whom were already under specialist palliative care. Recruitment rates were 7% for community-based methods and 40% for hospice. The recruitment methods differed in intensity of resource use. Recruitment via letter and a lack of engagement by healthcare professionals were found to be barriers. Facilitators included the researcher having personal involvement in recruitment.

Conclusion: The overall recruitment rate was in line with other studies for this patient cohort. Attempts to identify and engage patients through community-based postal contact were less effective than where personal contact with patients was both possible and occurred. Methods were less successful at recruiting patients who were not already engaged with hospice services.

Keywords Palliative care, recruitment, cancer, end-of-life, methods.

Introduction

Recruitment in health-services research is often challenging, especially when patients are seriously ill (Hopkinson et al., 2005, Stone et al., 2013, LeBlanc et al., 2013, Sygna et al., 2015, Kavanaugh et al., 2006, Cassel and Demel, 2001). In such circumstances reported recruitment rates are 20% of the eligible population with numerous reasons suggested by authors for these rates (Ling et al., 2000, Ewing et al., 2004, Hudson et al., 2005, Hanratty et al., 2012, LeBlanc et al., 2013, Sygna et al., 2015). Studies that are unable to recruit to their planned sample size may fail to achieve research objectives and may be less generalizable (Hopkinson et al., 2005). Time-pressures, due to the risk of rapid deterioration close to the end-of-life, may make recruitment and retention of participants particularly difficult (Hackett et al., 2016).

Gatekeeping is where either a healthcare professional or family member may decide on the patient’s behalf that they will not participate. It is often cited as a reason for low recruitment and is unethical as patient choice is taken away, skewing the sample towards subjects who are less ill (Ewing et al., 2004, Hudson et al., 2005). The views of others are often considered by patients, making the family member’s or healthcare professional’s own views important

(Grudzen et al., 2014, Hanson et al., 2014). Patients with life-limiting health conditions may indeed need more care and empathy at the point of recruitment compared with the general population (Addington-Hall, 2002). Participation in research may be seen as a burden even if what is asked of the patient is kept to the minimum. However, healthcare professionals are sometimes surprised at the willingness of patients at the end-of-life to take part in research (Hopkinson et al., 2005). Many patients with serious health conditions such as terminal cancer feel altruistic in the hope they might be able to improve the experiences of healthcare for others after they die (Hopkinson et al., 2005, White and Hardy, 2009, White et al., 2008b).

The design of palliative care research may influence the patient’s decision whether to take part. Patients at the end-of-life are more likely to take part in simple rather than complex interventions and the more time and effort they need to participate in the research, the less likely patients are to consent (White et al., 2008b, White and Hardy, 2010). Healthcare professionals are also known to favour less complex interventions and might therefore be more likely to refer patients into simple studies (White et al., 2008a). To encourage participation, studies need to make procedures as patient friendly as possible (White and Hardy, 2009, Hanson et al., 2014).

Researchers need to find methods that can identify suitable patients in complex and often disconnected healthcare systems. It is important for researchers to learn from the successes and failures of other studies so that future research can avoid pitfalls and improve efficiency and effectiveness of future recruitment in palliative care studies(Sygna et al., 2015).

Aim

To evaluate different recruitment methods used in the pharmacist-led IMPACCT study (Improving the Management of Pain from Advanced Cancer in the Community) (Research).

Objectives

- To evaluate recruitment methods.
- To identify individual barriers and facilitators to recruitment.
- To produce recommendations for recruitment into future similar studies.

Methods

The wider IMPACCT study was approved by the National Health Service ethics committee (14-YH-1126 141015) (Research). Minor and substantial amendments were applied for when appropriate during the iterative development of the recruitment methods.

Patients were eligible to participate in the study if they fulfilled the following criteria:

- Aged over 16 years old

- Diagnosed with advanced cancer[3]
- Aware of their diagnosis and experiencing pain associated with the cancer
- Living in the community
- In receipt of a prescription for moderate or strong opioids[4]
- Not prescribed anticipatory medicines[5] (therefore not in the last days of life)
- Capacity to provide informed consent
- Is a regular patient of one of the participating local community pharmacies.

The consultation

Patients were provided with one face-to-face consultation or two telephone medicines consultations from their usual community pharmacist or the Research Pharmacist (RP). All were accredited to provide these pharmacy services, however specific training was given to recruited pharmacists in pain

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[3] **Patients with advanced cancer** are defined as those with metastatic cancer with histological, cytological or radial evidence AND/OR those receiving anti-cancer therapy with palliative intent.

[4] **Strong and moderate opioids** are codeine, dihydrocodeine, hydrocodeine, tramadol, tapentadol, morphine, fentanyl, buprenorphine, diamorphine, hydromorphone, methadone and oxycodone.

[5] **Anticipatory medicines** are those given in the last few days of life to manage pain and other symptoms. Often patients are prescribed these when this time is imminent and such patients would be too poorly to take part in the study.

and palliative care. Further details of the consultation content and findings are available elsewhere (Edwards et al., 2019b).

Patient recruitment

Patients were recruited between November 2015 and March 2017. Recruitment approaches were developed iteratively in response to recruitment rates.

1. Community-based method

Identification of patients

Patients were identified using:

i) searches of General Practitioner (GP)[6] computer systems
ii) healthcare professional referral
iii) advertising
iv) hospital outpatient clinic list search.

These methods were chosen as the consultations were to be delivered from local community pharmacies. Patient consent was not sought until they were deemed eligible and suitable for the study.

i) searches of GP computer systems

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[6] **General Practitioners (GPs)** or Family doctors) usually work in group practices within the UK and have read and write access to shared computer clinical information systems.

GP practices were considered for inclusion in the study if they had accreditation for research from the Royal College of General Practitioners and employed a practice pharmacist[7] (who routinely conducts electronic record searches). Eight out of ten practices approached took part.

A data extraction tool was developed for the practice pharmacist to identify potentially suitable patients in the GPs' clinical information system (TPP-SystmOne). The resulting list of patients was then manually checked against study inclusion criteria and a secure electronic message was sent to the doctor to approve the patient invitation.

ii) healthcare professional referral

Local healthcare professionals (GP, district nurses and community pharmacists) were invited to presentations or individual meetings about the study to encourage participation and engagement. Pop-up messages were set up on GP computer systems to remind them when a patient was eligible. Eligibility was then checked using the patient record. Permission for district nurses to identify patients through their patient lists was secured from their local lead. Recruited community pharmacists were asked to identify potential patients and refer them to the practice pharmacist by telephone. Inclusion criteria was then checked, and approval was sought from the GP for invitation.

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[7] **Practice pharmacists** are based within GP practices to help with prescribing, audit and clinical duties.

iii) advertising

Community pharmacies were given posters to display and any interested patient would be referred to their practice pharmacist. No advertising was carried out in any other setting.

iv) hospital outpatient clinic list search

Due to low participation in the study, recruitment was extended to patients receiving care from hospital oncology outpatient clinics. Research nurses (RNs), funded by the Clinical Research Network (CRN)(NIHR, 2018) searched patient clinic lists and then checked eligibility using the hospital's information systems. In addition, the hospital outpatient pharmacy was asked to refer potential patients to the research nurses.

Approach to the patient

Patients were sent a participation information leaflet, consent form and accompanying letter by post. Surgery letters were signed by the practice pharmacist on behalf of the practice manager or the practice manager themselves. Hospital letters were signed by the RN. Those interested were invited to return the consent form to the University researchers and contact details were provided for any questions they might have about participating. All referrals and invitations were recorded on patient records to prevent anyone being invited more than once. Reasons for not inviting patients who were referred or identified were recorded.

2. Hospice-based method

Identification of patients

Community-based recruitment was not yielding high enough participation so additional methods were developed. Hospice[8] in-patients (admitted for symptom control), eligible for the study and ready to be discharged were identified by nursing staff.

Patients were also identified in the outpatient day-unit by the nursing staff.

Approach to the patient

Both inpatient and outpatient approaches were made by nursing staff. Inpatients were then given participant information sheets and consent forms by the hospice Research Fellow (RF)[9].Outpatients were given participant information sheets and consent forms by the nursing staff. Patients were given the opportunity to discuss participation with their family and ask any questions they had. The RP conducting the study had regular presence on-site and was available for any queries. Consent forms were then returned to the RP on-site. Reasons for not inviting patients who were identified were recorded.

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[8] **Hospice care** in the UK now routinely involves patient attending for outpatient clinics or being admitted for short-term symptom control.

[9] Hospice Research Fellows are hosted by some hospices in the UK to lead and coordinate research involving the site.

Sample size

The IMPACCT study (which this recruitment was for) was a feasibility study. Therefore, no statistical analysis was planned, so a target for recruitment of 25 patients was set. This was considered a large enough sample size to assess acceptability and feasibility of the proposed intervention and opportunistic comparison of recruitment rates of the different methods.

Data analysis

The healthcare professionals involved were asked to record and report the numbers of patients identified and invited by email from the beginning of the study. Reasons for patients not being invited to take part were also recorded. From this, recruitment rates for each method were calculated.

Successes and barriers for recruitment

Healthcare professionals and patients were able to communicate perceived success factors and barriers with the researcher. A list of success factors and barriers was then produced by the researcher based on recruitment rates and problems encountered for each method.

Results

In total 128 patients were identified as being potentially eligible for the study, 47 were invited to take part, 23 were recruited and 19 completed (Figure 1). Reasons for not inviting patients following identification are shown in Figure 1.

Figure 1 Consort diagram summarising recruitment

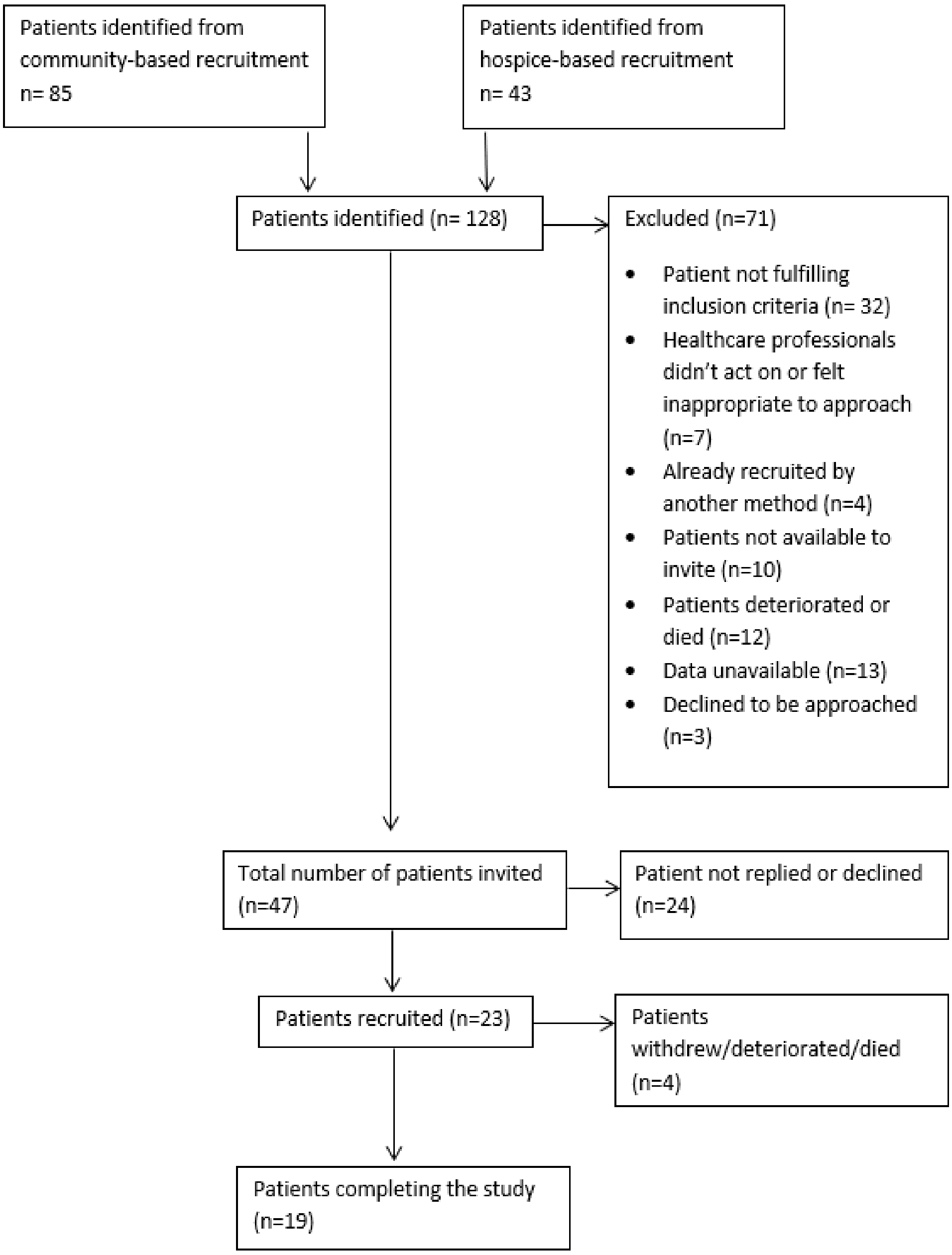

Table 1 shows how many patients were identified via each method.

Anecdotally, practice pharmacists told us that monthly searches in each practice were not always possible. Not all healthcare professionals recorded details as requested and data was missing for a minority of patients. Numbers of patients referred from hospital outpatient searches are unknown although no patients were recruited following this method. No patients were referred by district nurses. All four hospice in-patients who were recruited by the RF deteriorated and were unable to complete the study.

Table 1 A table showing a breakdown of patients identified by each recruitment method.

	Identification method	**Patients identified**	**Patients invited to the study**	**Participants recruited**	**Participants completing the study**
Community-based recruitment by letter	Searches of GP electronic system	63	25	4	4
	GP referral and pop-up	13	4	1	1
	District nurse referral		0	0	0
	Community pharmacist referral	1	0	0	0
	Community pharmacy poster		0	0	0
	Hospital research nurse	8	1	1	1
	Hospital Outpatient pharmacy		0	0	0
	Total	85	30	6	6
Hospice recruitment – face-to-face	Research fellow in hospice	5	4	4	0
	RP in hospice	38	13	13	13
	Total	43	17	17	13

Recruitment resulted in 2 patients who were not known to specialist palliative care services and 21 patients who were under their care.

Table 2 A recruitment breakdown showing patients identified and reasons patients were not invited to take part.

	Community-based recruitment	**Hospice recruitment**
Duration	16 months	5 months
Patients identified	85	43
Reasons for patients not being invited to participate		
Not currently in pain	3	5
Pain not related to cancer	1	0
Non-advanced disease	4	0
Anticipatory medicines issued	5	0
Nurse decided not appropriate	1	4
Already recruited	3	1
Did not use a participating pharmacy	14	N/A
Not available to approach	N/A	10
No follow-up by healthcare professional	2	0
Declined in person	N/A	3
Too unwell/deteriorated/died	9	3
Data unavailable	13	0
Invited to take part	30	17
By letter	30	0
Face-to-face	0	17
Recruited	6	17
Rate of identification to recruitment (%)	7	40
Died or withdrew before inclusion	0	4
Rate of identification to completion	7	30

Table 2 shows that recruitment from the community-based method took place over 16 months compared with 5 months in the hospice. Of a conservative estimate of 85 patients identified from the community-based method, 6 (7%) were recruited. Of 43 patients identified within the hospice, 17 (40%) were recruited although only 13 (30%) completed the study. The total number of patients recruited was 23; of whom 19 completed the study. Reasons for loss of patients between identification and invitation included not using a study pharmacy, lack of cancer-related pain and deterioration.

Some patients within the hospice environment requested large print documentation and often required someone to read the study information to them due to its length and complexity. It is unclear whether this was also an issue in the community recruitment.

The findings from the medicines consultations are reported elsewhere (Edwards et al., 2019b).

Table 3 summarises the success factors and barriers for recruitment which were found in this study.

Table 3 The success factors and barriers of recruitment methods of a palliative care study

Component	Reason for influence	Success factor or barrier?
Flexible approach to recruitment with willingness to adapt when required	If recruitment is not working one way, strategies may need to be adapted according to the environment to achieve desired participant numbers.	Success factor
Face-to-face recruitment by knowledgeable staff with initial introductions from trusted sources	Patient able to ask specific questions about the study and trusted source adding a form of endorsement.	Success factor
Research team having repeated presence in research environment	Staff able to form relationships with research team whilst acting as a constant reminder and training aid for the study.	Success factor
Recruitment from in-patient population about to be discharged	Patients tend to be nearer to death so increased deterioration and attrition.	Barrier
Lack of engagement of key personnel	Clinicians, recruiters, practice pharmacists who are not engaged will be unlikely to 'go the extra mile' to recruit patients. Healthcare professionals may feel threatened by alternative service.	Barrier
Impersonal recruitment (letter)	Letters and study documentation can be difficult to read and easy to ignore without context and someone to explain what might be involved.	Barrier
Gatekeeping	Clinicians may feel protective of patients and prevent access.	Barrier
Lack of knowledge and experience of talking to patients at the end-of-life	This may prevent conversations about recruitment occurring.	Barrier

Discussion

By iteratively developing and extending recruitment methods, sufficient patients were recruited and the method which yielded the greatest number of participants was identified.

As methods were developed iteratively, in response to recruitment rates, not all routes were available for the duration of the study. This makes any direct comparison between methods difficult. All methods used were complex, and whilst the hospice method of recruitment appeared to be most effective, we do not know whether this was due to the site and procedure of recruitment, the patients in hospice being a different subset of eligible patients or the face-to-face invitation. Not all personnel responsible for recruitment kept good records and communicated their findings to the researcher leading us to have some missing data. This was primarily healthcare professional identification numbers and reasons patients were not invited to take part from the practice pharmacists. This data would have made a more complete picture of recruitment. Also, our study design and ethical approval did not allow us to ask why patients did not want to take part and this information would have been useful when designing further studies. Future work will ensure this feedback is incorporated into the design as done in other studies (Sygna et al., 2015, LeBlanc et al., 2013).

The most effective method was hospice-based recruitment despite a loss due to deterioration, this may have been due to several factors. After the patient had been introduced to the study the hospice-based method enabled them to easily talk to the RP if they had any questions before deciding whether to take part in the study. These questions were also able to be asked in the community-based method, but the RP was not as readily accessible, and patients would have needed to contact them via telephone. The comparative successes of recruitment within hospices has been found by other researchers, who reported ease of identifying and accessing patients compared with primary and secondary care (Stone et al., 2013). The initial approach by hospice nurses may have resulted in higher recruitment due to their awareness of the needs and circumstances of individual patients (Kavanaugh et al., 2006, Fischer et al., 2012). The patient has an established relationship with hospice staff and sees the introduction to a study as a form of endorsement from a trusted source (Fischer et al., 2012, Hopkinson et al., 2005). Patients may have felt less apprehensive about participation as they had already met the RP who would be performing the medicines consultation although this may have been the case if patients had been able to meet the RP from community-based recruitment although this may not have been logistically possible. Established rapport and trust with the researcher is often gained by their repeated presence in the research environment and can be beneficial to recruitment (Fischer et al., 2012, Emmel et al., 2007, Eide and Kahn, 2008). Having study specific people at the point of recruitment to act as champions can be beneficial (Hanratty et al., 2012, Hanson et al., 2014). Both the hospice RF and the RP were highly motivated, and the hospice had made a commitment to research involvement more generally through their hosting of the RF. The benefits of the researcher’s personal role in the recruitment process has been found in other palliative care research and although this was feasible in this study where only a single hospice was involved, it may not be appropriate for a larger, multi-site study (Sygna et al., 2015).

Hospital recruitment had a very low recruitment rate although only a single hospital was involved. In contrast Stone et al found that hospital patients were more likely to consent to participate (once accessed) than patients from hospices and community settings although potential participants had direct access to the research team in this case and didn’t in the hospital in our study (Stone et al., 2013). The process of recruitment within the hospital was not a transparent one and communication with the team was more difficult than in the hospice setting. These problems with engagement and understanding of healthcare professionals involved in recruitment were not unique and resistance of some healthcare professionals to involvement in palliative care research has been found elsewhere. This may have been due to a lack of positive previous experience in research or concurrent studies competing for patients and research nurse time (Bullen et al., 2014, Fischer et al., 2012).

Several patients within the hospice wanted to ask family members what they thought before agreeing to take part and this may also have happened when recruiting by post (Grudzen et al., 2014, Hanson et al., 2014). This is a form of gatekeeping and future studies could produce family specific documentation for this purpose.

Recruitment through primary care electronic record searches was found to be the least successful method although it did identify the highest number of patients for invitation. Research governance requires that only those directly involved in patient care have access to patient records and the study was thus reliant on the goodwill of practice pharmacists to allow time to carry out searches. The requirement for GP approval and perceived complexity of the process may have deterred community pharmacists and district nurses from referring patients due to time constraints. No patients were referred by district nurses possibly due to lack of engagement or large work volumes. Electronic pop-ups in the GP clinical information system were not popular with healthcare professionals in this study but along with GP identification were responsible for the identification of 13 patients leading to one recruited. Pop-ups have been shown in other studies to have the potential to easily identify large numbers of suitable patients (Heinemann et al., 2011).

Referral from community pharmacies or the hospital outpatient pharmacy resulted in only a small number of patients identified. This may have been due to concerns about potentially difficult conversations with patients with advanced cancer or lack of access to patient records, which has been found to be a barrier for community pharmacists talking to this patient group (Savage et al., 2013, O'Connor et al., 2013).

Recruitment both from primary and secondary care was done via letter and this was less successful than the personal contact used in hospice care. This may have been due to difficulties in reading the letter as was experienced in the hospice and elsewhere (Petty et al., 2001).

Engagement of key personnel was found to be a barrier to recruitment (Table 3). Engagement was good amongst those with a personal interest in the study or topic and where the researcher was able to form relationships with those staff. Asking healthcare professionals to help in research design (as was done in the hospice) was found to improve engagement and recruitment.

Overall our recruitment rate was 23/128 (18%) and 19/128 (15%) completed the study. Attrition rates were low at 17% in contrast to a similar study but this may have been due to the short period of patient involvement in this study (Hussainy and Marriott, 2009).

Box 1 shows recommendations we have for future palliative care research based on our recruitment.

Box 1 Recommendations for recruitment strategies for future palliative care studies

Recommendations
1. Involve key stakeholders in research from the earliest opportunity. This will allow not only engagement but also opportunity to influence research and make research methods as user (patient and healthcare professional) friendly as possible and will help to reduce gatekeeping. **2. Concentrate recruitment for palliative care studies in hospices where possible.** **3. Recruit using trained and knowledgeable personnel via face-to-face methods with the opportunity for patients to ask questions where necessary.**

Conclusions

We aimed to evaluate different recruitment methods for pharmacist-led cancer pain medicines consultations. Recruitment was most effective from the hospice outpatient population, but this did not allow the identification of patients who were not already receiving palliative care. Face-to-face methods of recruitment were more effective than postal methods and the presence of the research team within the study environment was found to be beneficial.

Early involvement of stakeholders such as healthcare professionals who may be involved in patient identification helps shape effective research and their engagement is key to success.

A flexible approach to recruitment in palliative care research is essential and it is important to learn from the successes and failures of similar research if recruitment for future studies should be successful.

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Appendix 4

Paper 4

A community pharmacist medicines optimisation service for patients with advanced cancer pain: a proof of concept study

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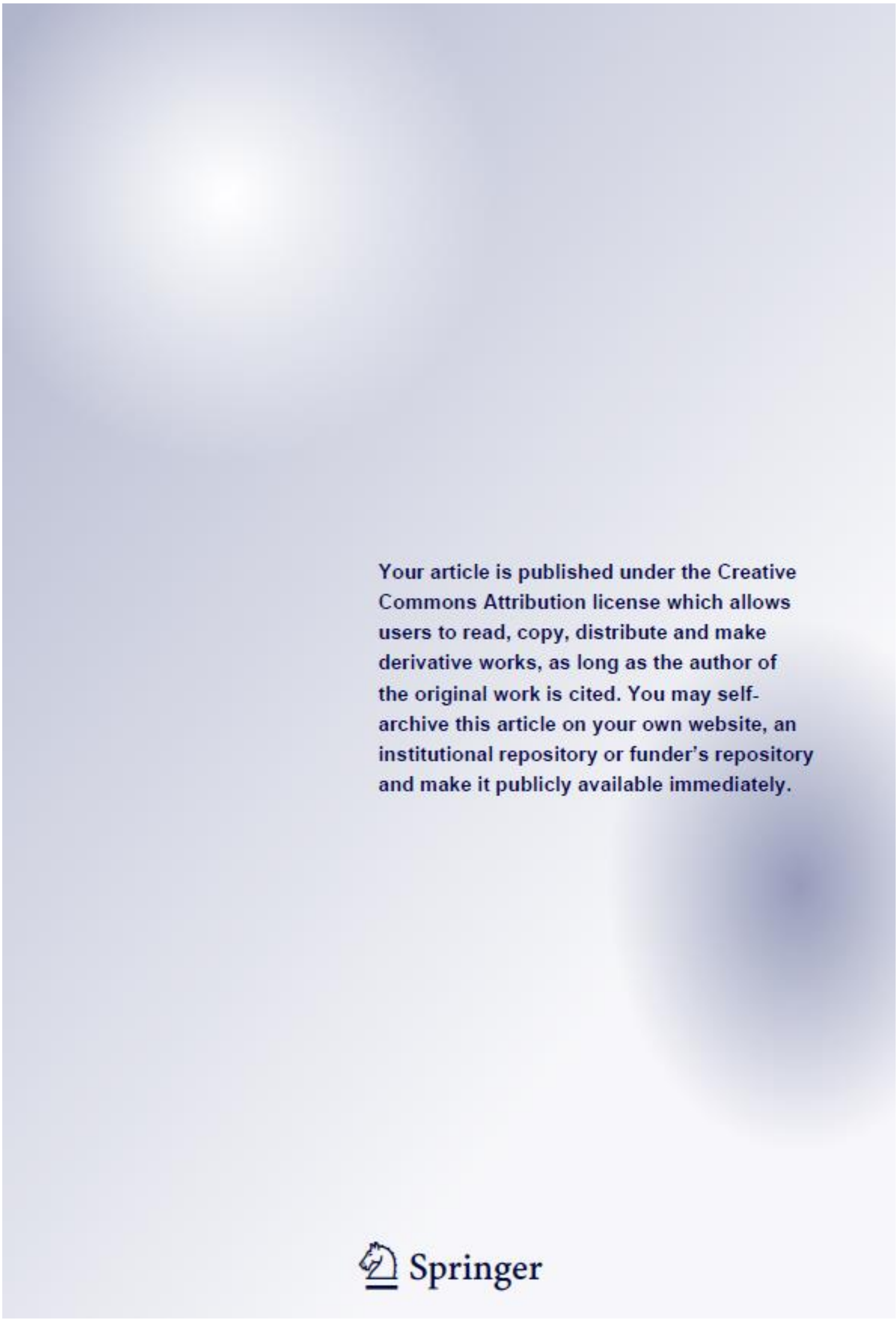

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RESEARCH ARTICLE

A community pharmacist medicines optimisation service for patients with advanced cancer pain: a proof of concept study

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Abstract

Background Patients with advanced cancer commonly experience pain and it is least controlled in community settings. Community pharmacists in the UK already offer medicines optimisation consultations although not for this patient group. *Objective* To determine whether medicines consultations for patients with advanced cancer pain are feasible and acceptable. *Setting* Community-dwelling patients with advanced cancer pain were recruited from primary, secondary and tertiary care using purposive sampling in one UK city. *Methods* One face-to-face or two telephone delivered medicines optimisation consultations by pharmacists were tested. These were based on services currently delivered in UK community pharmacies. Feedback was obtained from patients and healthcare professionals involved to assess feasibility and acceptability. *Main outcome measure* Recruitment, acceptability and drug related problems. *Results* Twenty-three patients, (range 33–88 years) were recruited, 19 completed consultation(s) of whom 17 were receiving palliative care services. Five received face-to-face consultations and 14 by telephone during which 47 drug related problems were identified from 33 consultations (mean 2.5). Advice was provided for 34 drug related problems in 17 patients and referral to other healthcare professionals for 13 in 8 patients, 2 patients had none. Eleven patients returned questionnaires of which 8 (73%) would recommend the consultations to others. *Conclusion* The consultations were feasible as patients were recruited, retained, consultations delivered, and data collected. Patients found the 20–30 min intervention acceptable, found a self-perceived increase in medicines knowledge and most would recommend it to others. Community pharmacists were willing to carry out these services however they had confidence issues in accessing working knowledge. Most drug related problems were resolved by the pharmacists and even among patients receiving palliative care services there were still issues concerning analgesic management. Pharmacist-conducted medicines consultations demonstrate potential which now needs to be evaluated within a larger study in the future.

Keywords Cancer · Community pharmacy · Medicines optimisation · Pain · Palliative care · Remote consultation · United Kingdom

Impacts on practice

- Pharmacist-delivered medicines consultations are feasible and acceptable to cancer patients and have the potential to benefit clinical care.
- Even for patients under specialist palliative care services, unmet medicines-related needs can be identified by pharmacists.
- Access to pharmacist care for patients with advanced cancer who are not able to visit the pharmacy in person should be improved.

Introduction

Over half of patients with advanced cancer will experience poorly controlled pain during their last year of life [1, 2]. Only 18% of patients at the end-of-life living in the community describe their pain as well controlled compared with 38% of patients in hospitals and 63% of patients in hospices

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Table 1 Medicines optimisation services provided by community pharmacies in England and Wales

Service	Medicine use review (MUR)	New medicine service (NMS)
Which patients?	70% must be targeted towards specified patient disease groups (not including cancer). The remainder may be carried out with any other patient [9]. They must be carried out in the patients usual community pharmacy [9]	Patients prescribed new medicines for specified long-term conditions [10]
Method of delivery	One consultation, usually face-to-face but telephone possible with relevant permissions [9]	Patient can choose face to face or telephone delivery. Up to three consultations: Initial advice, intervention and follow-up consultations usually by telephone [10]
Use in patients with cancer	Research indicates rarely provided [11]	Cancer not one of the specified long-term conditions [10]
Reimbursement	£28 [9]	Between £20 and £28 depending on number provided [10]

[3]. Often, community-based patients feel they lack support with their medicines taking and accept experiencing pain [4].

Community Pharmacists are the healthcare professional seen most frequently by patients with cancer (along with community nurses) [5] and are often available in every locality without an appointment. Community pharmacies may be in or near family doctor practices or sometimes in shopping centres or supermarkets and could potentially be an accessible source of medicines support for patients with cancer pain. Medicines optimisation services are provided by community pharmacists in the UK, USA, Australia and New Zealand with the aim of helping patients get the most benefit possible from the medicines they have been prescribed [6–10]. In the UK the two most common are detailed in Table 1.

The World Health Organization Pain ladder provides stepwise guidance for adult pain management [11]. Severe pain can usually be controlled by regular dosing of simple pain killers, adjuncts and sustained-release pain medication with top-up or breakthrough doses in-between but patients need to understand their medicines to gain optimum benefit from them [12, 13]. Pharmacist medicines consultations have been shown to increase patient knowledge and have associated improvements in medicines adherence [14, 15].

Although community pharmacist medicines consultations are rarely carried out with patients experiencing cancer pain, several studies have investigated the contributions they could make [16–19]. Outcome measures included the quantity of Drug Related Problems (DRPs), recommendations made and an assessment of the appropriateness of recommendations [16–20]. A DRP can be defined as an event or circumstance involving drug therapy that actually or potentially interferes with desired health outcomes [21]. Patient's perspectives are often difficult to obtain post-intervention from patients with advanced disease due to rapid deterioration and only one study included this [18, 22]. A recent systematic review showed that pharmacist educational interventions are potentially beneficial for patients with cancer pain but further research is needed in this area [23].

Lack of pharmacist confidence to provide services for patients with cancer has been identified as a barrier to service provision [24–26]. All previous studies either employed a specialist palliative care pharmacist or provided some sort of additional training, although the content and evidence-base of training was not always reported [16–19].

Aim

To evaluate pharmacist medicines consultations for patients with advanced cancer and to ascertain their feasibility and acceptability.

Ethics approval Ethical permission was granted from Leeds West National Health Service and Bradford University Ethical Committee in October 2014 (14-YH-1126 141015). This study was part of the larger Improving the Management of Pain from Advanced Cancer in the Community (IMPACCT) study.

Method

Recruitment site identification

Research ready family doctor practices with practice pharmacists[1] were identified and approached. Recruitment commenced in November 2015 and continued until March 2017.

The recruitment process was iterative responding to the levels of identification and recruitment of patients. New and refined recruitment methods were developed, and the local

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[1] Practice pharmacist refers to a role within family doctor or General Practitioner (GP) practices which aids with prescribing, audit, costing and sometimes performing clinical roles. They were involved in this study to allow electronic records to be checked to identify patients and assess eligibility criteria.

Box 1 Recruitment criteria

1. Aged over 16 years old
2. Have advanced cancer[a], are aware of their diagnosis and are suffering from pain
3. Been given a prescription for opioids[b]
4. Have not been prescribed anticipatory medicines[c] and are therefore not in the last days of life
5. Have the capacity to provide informed consent and complete questionnaires before and after the consultation

[a] Patients with advanced cancer are defined as those with metastatic cancer with histological, cytological or radiological evidence AND/OR those receiving anti-cancer therapy with palliative intent

[b] Opioids are codeine, codeine and paracetamol, codeine and ibuprofen, dihydrocodeine, paracetamol and hydrocodeine, tramadol, tapentadol, morphine, fentanyl, buprenorphine, diamorphine, hydromorphone, methadone and oxycodone

[c] Anticipatory medicines are medicines which are often used to control symptoms in the last days of life. These are usually prescribed in a package as this time approaches

hospital and hospice were invited to be recruitment sites towards the end of the study.

Community pharmacist recruitment

The 10 pharmacies closest to the practices recruited were identified (four from national multiples and six independents) and contact was made with owners or head offices. Nine agreed to take part with one independent stating lack of interest. An interactive briefing session for the pharmacists was developed based on the specific needs of community pharmacists found in previous studies [24–26]. Information from a specialist nurse and a cancer support charity was delivered and role plays were carried out with a cancer survivor from our Patient and Public Involvement (PPI) group. Pharmacists and support staff representing all community pharmacies attended the training which was well received.

Patients who used one of the study pharmacies were offered either a telephone-based Medicine Use Review (MUR) or a face-to-face MUR (see Table 1).

Patients who did not use one of the study pharmacies were offered telephone consultations from the Research Pharmacist (RP) using the New Medicine Service (NMS) format allowing the same issues to be discussed over a series of two telephone consultations (see Table 1). Our earlier research showed that patients with advanced cancer were willing to try this [4].

Patient recruitment

In family doctor practices, searches using the study inclusion criteria (see Box 1) were conducted in electronic systems by practice pharmacists. Community pharmacists, district nurses and family doctors were asked to refer suitable patients to the GP practice, where the practice pharmacist screened them and confirmed suitability with their GP. Oncology research nurses at the local hospital were asked to conduct outpatient clinical records searches. The hospital outpatient pharmacy was asked to refer patients to the research nurses. Patients from primary and secondary care recruitment were then invited to take part by letter.

The hospice research nurse, together with the study RP undertook recruitment in the local hospice. Patients about to be discharged or attending outpatient clinics were introduced to the study by their nurse. Those who expressed interest were provided with written information and consented face-to-face by the RP.

All patients gave written consent.

Sample

As this was a proof-of-concept study a formal sample size was not required but we aimed to recruit 25 patients as this was adequate to assess whether it was possible to recruit and retain patients, whether the consultations were deliverable and acceptable to patients and healthcare professionals involved.

Medicines optimisation consultations

The length of each consultation was noted by the pharmacist and any recommendations made to the patient and/or the prescriber were documented contemporaneously, in line with usual practice for NMS and MUR. Consultation records used a study code and did not contain any patient identifiable information.

Patient and pharmacist feedback

Baseline and post-consultation follow-up patient questionnaires were developed based on validated pain measurement tools used in the IMPACCT study [27, 28]. Drafts were piloted with the study PPI group and feedback was obtained. The questionnaire included quantitative and qualitative questions about levels of pain (worst experienced in the last 24 h and at time of questionnaire completion on a 0–10 scale (0 = no pain to 10 = pain as bad as they could imagine). Self-reported knowledge information was also collected. The baseline questionnaire was posted before the consultation with a stamped addressed return envelope. The follow-up questionnaire was sent 2 weeks after the final consultation and included additional questions on self-perceived benefit from the consultation and whether the patient would recommend the medicines consultation to others. Questionnaires are available on request from the author.

Data analysis

Medicines consultation records were coded by the RP using the Pharmaceutical Care Network Europe (PCNE) classification which is a validated system developed by experts to document DRPs, their cause and action taken following their identification [21].

Information from the baseline and follow-up questionnaires was collated and analysed using Excel spreadsheets.

Feasibility

This will be assessed by whether it was possible to recruit and retain patients throughout the study and whether it was possible to train community pharmacists to deliver consultations.

Acceptability

A theoretical framework which was developed based on systematic reviews involving acceptability and inductive and deductive reasoning of reviews and literature is available [29]. The framework details acceptability before (prospective), during (concurrent) and after the intervention (retrospective). This was adapted to assess acceptability of the intervention. Three questions requiring likert responses were included in the questionnaires as a result:

1. I feel I benefitted from the consultation.
2. I was able to ask all the questions I wanted to.
3. I would recommend a pharmacist pain medicines consultation to other people.

Data was also collected on whether the community pharmacists completed the consultations when they were requested to do so. The day after the scheduled consultation, the RP telephoned the community pharmacist and gathered unstructured feedback about the experience of providing the consultation.

Results

128 patients were identified for the study; 47 were confirmed as eligible by their healthcare professional and invited to take part. Twenty-three consented to participate and 19 received the medicines consultations of whom 17 were already receiving specialist palliative care services.[2] Four patients deteriorated or died before they had consultations. Patients were aged between 33 and 88 (average 64 years old). More detail about recruitment methods is available elsewhere [30].

Four community pharmacists were requested to deliver five consultations, of which all took place. Five patients had a face-to-face MUR from four different community pharmacists (3 independents and 1 multiple) and 14 had two NMS-type consultations from the RP. Five patients were unavailable at the second telephone consultation and required further phone calls. One patient had hearing difficulties and asked for his spouse to be involved in the telephone call to aid communication.

The mean duration of medicines consultations was 31 min for MUR (range 20–60 min) and for the NMS type consultations the mean total time for the two consultations was 18 min (range 9–29 min) per patient.

In total 47 DRPs were identified in 17 patients with a mean of 2.5 per patient (range 0–7, median 2) (see Table 2). Consultations were often multi-faceted (see Exemplar case studies-Box 2) and MURs averaged 1.2 DRPs per patient and the NMS-type averaged 3. Advice was given to 17 patients to resolve 34 DRPs and 13 (for 8 patients) were addressed by referral to other healthcare professionals: 6 to recommend prescribing of additional medication (for pain, constipation or dry mouth), 2 for a concomitant medicines query, 2 to recommend an alternative medicine (for constipation), 1 for an alternative dosage form and 2 to flag up important symptoms to the prescriber.

Full details of the PCNE classification can be found in "Appendix 1" [21].

Feedback from patients

Eleven patients returned both baseline and post-consultation questionnaires. The answers to the three acceptability

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[2] Specialist Palliative Care Services are received by patients who have been referred and usually involves access to multidisciplinary palliative care healthcare professionals to provide symptom control.

Table 2 Medicine related problems and how they were addressed (n= 19)

Patient	Were they receiving specialist palliative care?	No of MRPs identified	MRP details	PCNE problem	PCNE cause	PCNE inter-vention
Ph8X1	Unknown	2	Advice	P3.3	C5.2	I2.1
			Advice	P3.3	C5.2	I2.1
Ph4X1	Y	2	Pain—paracetamol	P1.2	C7.1	I2.1
			Constipation	P1.3	C1.6	I2.1
Ph8X2	Y	0	–	–	–	–
Ph10X1	N	0	–	–	–	–
Ph9X1	Y	2	Adjuvant dosage	P1.2	C5.2	I2.1
			Constipation[a]	P1.3	C1.6	I1.3
MC5	Y	3	Pain	P1.1	C3.5	I2.1
			Compliance	P1.2	C7.1	I2.1
			Advice	P3.3	C5.2	I2.1
MC6	Y	3	Pain—ibuprofen	P1.2	C7.1	I2.1
			Pain—paracetamol	P1.2	C7.1	I2.1
			Breathlessness	P1.3	C5.2	I2.1
MC7	Y	3	Compliance	P1.2	C7.7	I2.1
			Pain—paracetamol[a]	P1.2	C1.6	I1.4
			Other medication[a]	P1.3	C7.1	I1.4
MC8	Y	2	Drug form[a]	P1.2	C2.1	I1.3
			Side effects	P2.1	C5.2	I2.1
MC9	Y	2	Pain—Paracetamol	P1.2	C7.1	I2.1
			Side effects	P2.1	C5.2	I2.1
MC10	N	2	Pain—paracetamol	P1.2	C7.1	I2.1
			Compliance	P1.2	C7.1	I2.1
MC11	Y	1	Constipation	P1.2	C7.1	I2.1
MC12	Y	5	Pain	P1.2	C7.7	I2.1
			Side effect	P2.1	C5.2	I2.1
			Constipation	P1.2	C7.1	I2.1
			Side effect	P2.1	C5.2	I2.1
MC13	Y	3	Pain[a]	P1.2	C3.1	I1.3
			Laxative[a]	P1.2	C3.1	I1.4
			Advice	P3.3	C5.2	I2.1
MC14	Y	1	Other medication	P1.2	C7.7	I2.1
BRI1	Y	3	Pain	P1.2	C7.1	I2.1
			Constipation[a]	P1.3	C1.6	I1.3
			Medicines sourcing	P3.3	C5.2	I2.1
			Side effect[a]	P2.1	C5.2	I2.1
MC15	Y	2	Pain	P1.2	C7.1	I2.1
			Other medication issues[a]	P3.2	C1.5	(I1.4, I3.5)
MC16	Y	5	Pain—morphine	P1.2	C7.1	I2.1
			Pain—paracetamol	P1.2	C7.1	I2.1
			Constipation	P1.2	C7.1	I2.1
			Side effects[a]	P1.3	C1.6	I1.4

Table 2 (continued)

Patient	Were they receiving specialist palliative care?	No of MRPs identified	MRP details	PCNE problem	PCNE cause	PCNE inter-vention
MC17	Y	7	Pain[a]	P1.3	C1.6	I1.3
			Pain[a]	P1.3	C1.6	I1.3
			Advice	P3.3	C5.2	I2.1
			Side effects	P1.2	C5.2	I2.1
			Advice	P3.3	C5.2	I2.1
			Constipation	P1.2	C7.1	I2.1
			Constipation[a]	P1.2	C1.6	I1.4

[a] Indicates MRPs which were referred to another healthcare professional

Table 3 Participants' baseline and follow-up questionnaire responses including acceptability data (n = 11)

	Pre-intervention average pain score (0–10)	Post-intervention average pain score (0–10)	Pre-intervention "Do I know enough about my medicines?"	Post intervention "Do I know enough about my medicines?"	I feel I benefited from the consultation?	I was able to ask all the questions I wanted to?"	I would recommend a pharmacist pain medicines consultation to other people?
Ph8X2	0.5	6.0	Don't know	Yes	Agree	Agree	Agree
Ph10X1	0.0	0.0	Yes	Not answered	Strongly agree	Strongly agree	Strongly agree
Ph9X1	6.5	7.5	No	No	Neutral	Agree	neutral
MC6	2.0	1.5	Don't know	Yes	Neutral	Agree	neutral
MC7	3.0	3.5	No	No	Disagree	Not answered	Not answered
MC9	4.0	7.0	Yes	Yes	Agree	Strongly agree	Strongly agree
MC10	4.0	2.5	Yes	Yes	Agree	Agree	Agree
MC11	3.5	1.5	No	No	Neutral	Agree	Agree
MC14	6.0	6.0	No	Yes	Strongly agree	Strongly agree	Strongly agree
MC15	3.0	3.5	No	Yes	Strongly agree	Strongly agree	Strongly agree
MC16	5.0	4.5	No	Yes	Agree	Agree	Agree

Unknown is stated where questionnaires were not returned

Box 2 Exemplar patient case studies

Case 1

Patient MC13 who was taking multiple medicines, was discharged from the hospice after several weeks of symptom control. The patient received the NMS style intervention but felt that it would have been more useful before their inpatient stay.

At consultation 1 the patient only had a few questions about their medication.

At consultation 2 (2 weeks later) their pain had changed, they were struggling with control, using seven top-up doses of strong opioid each day and severely constipated. The patient reported struggling psychologically with others' perceptions of their pain. Other issues discussed included getting the best use from currently prescribed medicines. A referral was made to the patient's usual healthcare professional for a suggested increase in slow-release strong opioid and a change in constipation medication. The pharmacist was asked by the healthcare professional to recommend medication for constipation and to investigate its availability.

Case 2

When patient MC5 was contacted for the first NMS-style consultation they were in severe pain and had not been taking their medication as they were in "too much pain" with the pain affecting their ability to think, sleep and function. Paracetamol and tramadol had been prescribed but the patient was not taking paracetamol as they thought their condition was beyond that. The pharmacist explained about taking pain medication on a regular basis and how this could prevent large spikes in pain, and that the effects of paracetamol could make a difference. The patient was concerned about transitioning to strong opioid medication in the future and the associated risk of addiction. This was discussed at length. At the second consultation 9 days later, the patient had started taking more regular pain relief, including a new prescription for morphine sulphate liquid and reported great improvement.

questions are shown in Table 3 along with other questions regarding pain and self-reported knowledge.

Pre-consultations, the mean pain score was 4.1 (range 0–8) and three patients felt they knew enough about their medicines compared with 4.0 and seven at follow-up. No other medicines education support was reported by patients during the intervention period.

Feedback from community pharmacists

At the follow-up phone call after the consultations three of the four community pharmacists reported having some challenges in carrying out the consultations. Two reported lack of confidence and three had difficulties in retaining knowledge when the consultations were so infrequent.

Difficulties with recruitment

Several methods of recruitment were used of which one (hospice) produced 18 of the 23 participants. Face to face recruitment methods were found to be more effective than by letter and recruitment was more successful where healthcare professionals were engaged in the study. Full details and evaluation of methods used are reported elsewhere [30].

Discussion

This study shows that even for patients receiving specialist palliative care, pharmacist-delivered medicines consultations were feasible and acceptable to patients and had the potential to benefit clinical care.

Feasibility

We found that identification of patients was more difficult than expected so additional methods were developed iteratively. Recruitment and attrition rates were in line with other similar studies [31, 32].

Community pharmacists found it difficult to retain working knowledge regarding cancer and this could potentially be improved if the consultations were carried out more frequently. Creation of referral pathways to community pharmacy were not successful, therefore we also tested telephone provision of medicines consultations by one centralised RP. This was used successfully with a broad age range of patients.

We know from previous research that one in three patients are never referred to specialist palliative care services and we hypothesise that these patients may have greater need for a medicines consultation [4, 33]. Recruitment methods used were less successful in finding those who had not been referred to palliative care. Even though almost all our participants were receiving this; a mean of 2.5 DRPs per patient was found showing a need for extra support even in this group.

Acceptability to patients

All patients who had an NMS-type service (n= 14) agreed to the second consultation after having the first so we deduce that patients found them acceptable.

The majority of consultations were carried out via telephone. This method was acceptable for all patients who received it and some studies show this may even be preferable for some, especially those who are seriously ill [4, 34]. Telephone-based appointments are already used in many community pharmacies and family doctor practices with high levels of patient satisfaction [35–37].

Retrospective acceptability can be estimated by perceived effectiveness and self-efficacy. Most patients felt they benefitted from the consultations (which was also found elsewhere), were able to ask all the questions they wanted to and would recommend it to others [35]. There was an increase in patients who felt they knew enough about their medicines following the intervention indicating that knowledge was increased. Pain levels in this patient group can change rapidly due to the nature of the illness although average pain levels remained the same [22]. This may be due to a negation in the expected deterioration over time although on such a small sample it is difficult to draw any such conclusions. Patient evaluation is more likely to be obtained following a one-off intervention so this may have affected our response rates [38].

Acceptability to healthcare professionals

One community pharmacy (n= 10) declined to be involved but all 9 who agreed sent representatives to the voluntary training showing prospective acceptability was generally good. There were a mix of independent and multiple community pharmacies showing a willingness of both groups to take part.

Only one pharmacist (other than the RP) was asked to carry out more than one consultation and although they agreed, this is not enough to signify acceptability at this stage.

Potential to benefit clinical care

As in other studies the most common DRP identified was pain and several participants were not taking simple painkillers as recommended because they had not been prescribed [11, 17]. The next most identified DRP was constipation, again a finding in other studies [16, 17, 20]. Almost three quarters of DRPs concerned treatment effectiveness. Seventeen MRPs related to patients not understanding how and why to take medications after they had been prescribed. In some cases, medication was ineffective, and the patient required a stronger dose or a change in treatment.

Pharmacists were able to resolve the majority of DRPs with the patient; eight of the 19 patients were referred to nurses or GPs. Many of the referrals would have been prevented if the pharmacist conducting the consultations had been a prescriber with access to medical records. In several previous studies, the pharmacist was either a trained prescriber or was part of a palliative care team that could organise changes in prescribing [17–20, 39]. Acceptance of DRP recommendations by prescribers was unknown and future studies need to track this.

Limitations of the study

Most patients taking part already had access to palliative care professionals and associated medicines support. If patients had been recruited before referral to palliative care, there may have been an opportunity to educate at an earlier stage.

Patients receiving two consultations were hospice outpatients who had already been referred to palliative care and therefore are more likely to have greater need for symptom control; this may have affected the type and number of DRPs found compared with those who had not been referred. It may be that this group would have more DRPs than those not yet referred to palliative care or it may be that they would have already had more opportunity to get DRPs addressed. This would benefit from further testing across both patient groups.

Acceptability was measured before, during and after the consultations. The numbers of participants, pharmacists and healthcare professionals returning questionnaires was small and this may affect the validity of the results.

Conclusion

The consultations were feasible to deliver, and patients found them acceptable. Community pharmacists were willing to provide these services although found working knowledge to be problematic due to the infrequent nature of the consultations. Further evaluation of clinical and cost-effectiveness is now needed.

Pharmacist medicines consultations were able to identify a substantial number of DRPs in patients with advanced cancer pain. Problems with inadequate pain relief and associated side effects were most prevalent and the majority of these could be addressed by the pharmacist even in patients already receiving specialist palliative care.

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Conflicts of interest The authors declared no potential conflicts of interest with respect to this research and publication.

Appendix 1

See Table 4.

Table 4 PCNE classification scheme for drug-related problems V8.02 [21]

Primary domain	Code	Problem
The problems		
1. Treatment effectiveness	P1.1	No effect of drug treatment
	P1.2	Effect of drug treatment not optimal
	P1.3	Untreated symptoms or indication
2. Treatment safety	P2.1	Adverse drug event (possibly) occurring
3. Others	P3.1	Problem with cost-effectiveness of the treatment
	P3.2	Unnecessary drug-treatment
	P3.2	Unclear problem/complaint
Primary domain	**Code**	**Cause**
The causes		
1. Drug selection	C1.1	Inappropriate drug according to guidelines/formulary
	C1.2	Inappropriate drug (contra-indicated)
	C1.3	No indication for drug
	C1.4	Inappropriate combination of drugs (inc. herbal)
	C1.5	Inappropriate duplication of therapeutic group/active ingredient
	C1.6	No drug treatment in spite of existing indication
	C1.7	Too many drugs prescribed for this indication
2. Drug form	C2.1	In appropriate drug form (for this patient)
3. Dose selection	C3.1	Drug dose too low
	C3.2	Drug dose too high
	C3.3	Dosage regiment not frequent enough
	C3.4	Dosage regiment too frequent
	C3.5	Dose timing instructions wrong, unclear or missing
4. Treatment duration	C4.1	Duration of treatment too short
	C4.2	Duration of treatment too long
5. Dispensing	C5.1	Prescribed drug not available
	C5.2	Necessary information not provided
	C5.3	Wrong drug. Strength or dosage advised (over the counter)
	C5.4	Wrong drug or strength dispensed
6. Drug use process	C6.1	Inappropriate timing of administration and/or dosing intervals
	C6.2	Drug under-administered
	C6.3	Drug over-administered
	C6.4	Drug not administered at all
	C6.5	Wrong drug administered
	C6.6	Drug administered via wrong route
7. Patient related	C7.1	Patient uses/takes less drug than prescribed or does not take the drug at all
	C7.2	Patient uses/takes more drug than prescribed
	C7.3	Patient abuses drug (unregulated overuse)
	C7.4	Patient uses unnecessary drug
	C7.5	Patient takes food that interacts
	C7.6	Patient stores drug inappropriately
	C7.7	Inappropriate tining or dosing intervals
	C7.8	Patient administers/uses the drug in a wrong way
	C7.9	Patient unable to use drug/form as directed
8. Other	C8.1	No or inappropriate outcome monitoring
	C8.2	Other cause; specify
	C8.3	No obvious cause

Table 4 (continued)

Primary domain	Code	Intervention
The planned interventions		
No intervention	I0.1	No intervention
1. At prescriber level	I1.1	Prescriber informed only
	I1.2	Prescriber asked for information
	I1.3	Intervention proposed to prescriber
	I1.4	Intervention discussed with prescriber
2. At patient level	I2.1	Patient (drug) counselling
	I2.2	Written information provided (only)
	I2.3	Patient referred to prescriber
	I2.4	Spoken to family member/caregiver
3. At drug level	I3.1	Drug changed to…
	I3.2	Dosage changed to…
	I3.3	Formulation changed to…
	I3.4	Instructions for use changed to…
	I3.5	Drug stopped
	I3.6	New drug started
4. Other intervention or activity	I4.1	Other intervention (specify)
	I4.2	Side effect reported to authorities
Primary domain	Code	Implementation
Acceptance of the intervention proposals		
1. Intervention accepted (by prescriber or patient)	A1.1	Intervention accepted and fully implemented
	A1.2	Intervention accepted, partially implemented
	A1.3	Intervention accepted but not implemented
	A1.4	Intervention accepted, implementation unknown
2. Intervention not accepted (by prescriber or patient)	A2.1	Intervention not accepted: not feasible
	A2.2	Intervention not accepted: no agreement
	A2.3	Intervention not accepted: other reason
	A2.4	Intervention not accepted: unknown reason
3. Other	A3.1	Intervention proposed, acceptance unknown
	A3.2	Intervention not proposed

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Appendix 5

Statement of author contributions

Alison Blenkinsopp

Statement regarding authorship of jointly-authored works to be submitted for the Degree of Doctor of Philosophy by Published Works

This is to confirm that Zoe Edwards is a co-author of the following publications of which I am also an author:

1. Edwards. Z, Blenkinsopp. A, Ziegler. L, Bennett. MI (2018). How do patients with cancer pain view community pharmacy services? An Interview **study**. Health & Social Care in the Community. 00:1-12 DOI:10.1111/hsc12549

I confirm that Zoe's contribution to this publication was as *lead author or 60%* of the work.

2. Edwards. Z, Ziegler. L, Craigs. C, Blenkinsopp. A, Bennett. MI (2019). **Pharmacist educational interventions for cancer pain management: a systematic review and meta-analysis**. International Journal of Pharmacy Practice. DOI:10.1111/ijpp12516.

I confirm that Zoe's contribution to this publication was as *lead author or 60%* of the work.

3. Edwards. Z, Bennett. MI, Petty. DR, Blenkinsopp. A. **Evaluating the effectiveness of recruitment methods of patients with advanced cancer.** Accepted by the International Journal of Pharmacy Practice May 2019.

I confirm that Zoe’s contribution to this publication was as *lead author or 60%* of the work.

4. Edwards. Z, Bennett. MI, Blenkinsopp. A (2019). **A community pharmacist medicines optimisation service for patients with advanced cancer pain: a proof of concept study.** International Journal of Clinical Pharmacy. DOI: 1007/s11096-019-00820-8.

I confirm that Zoe’s contribution to this publication was as *lead author or 60%* of the work.

Signature: Alison Blenkinsopp

Name: Alison Blenkinsopp

Position: Professor of the Practice of Pharmacy

Date: 1st June 2019

Appendix 6

Statement of author contributions

Mike Bennett

Statement regarding authorship of jointly-authored works to be submitted for the Degree of Doctor of Philosophy by Published Works

This is to confirm that Zoe Edwards is a co-author of the following publications of which I am also an author:

1. Edwards. Z, Blenkinsopp. A, Ziegler. L, Bennett. MI (2018). **How do patients with cancer pain view community pharmacy services? An Interview study**. Health & Social Care in the Community. 00:1-12 DOI:10.1111/hsc12549

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2. Edwards. Z, Ziegler. L, Craigs. C, Blenkinsopp. A, Bennett. MI (2019). **Pharmacist educational interventions for cancer pain management: a systematic review and meta-analysis**. International Journal of Pharmacy Practice. DOI:10.1111/ijpp12516.

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I confirm that Zoe's contribution to this publication was as *lead author or 60%* of the work.

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Name: Michael Bennett

Position: St Gemma's Professor of Palliative Medicine

Date: June 6th 2019

Appendix 7

Statement of author contributions

Lucy Ziegler

Statement regarding authorship of jointly-authored works to be submitted for the Degree of Doctor of Philosophy by Published Works

This is to confirm that Zoe Edwards is a co-author of the following publications of which I am also an author:

1. Edwards. Z, Blenkinsopp. A, Ziegler. L, Bennett. MI (2018). **How do patients with cancer pain view community pharmacy services? An Interview study**. Health & Social Care in the Community. 00:1-12 DOI:10.1111/hsc12549

I confirm that Zoe's contribution to this publication was as *lead author or 60%* of the work.

2. Edwards. Z, Ziegler. L, Craigs. C, Blenkinsopp. A, Bennett. MI (2019). **Pharmacist educational interventions for cancer pain management: a systematic review and meta-analysis**. International Journal of Pharmacy Practice. DOI:10.1111/ijpp12516.

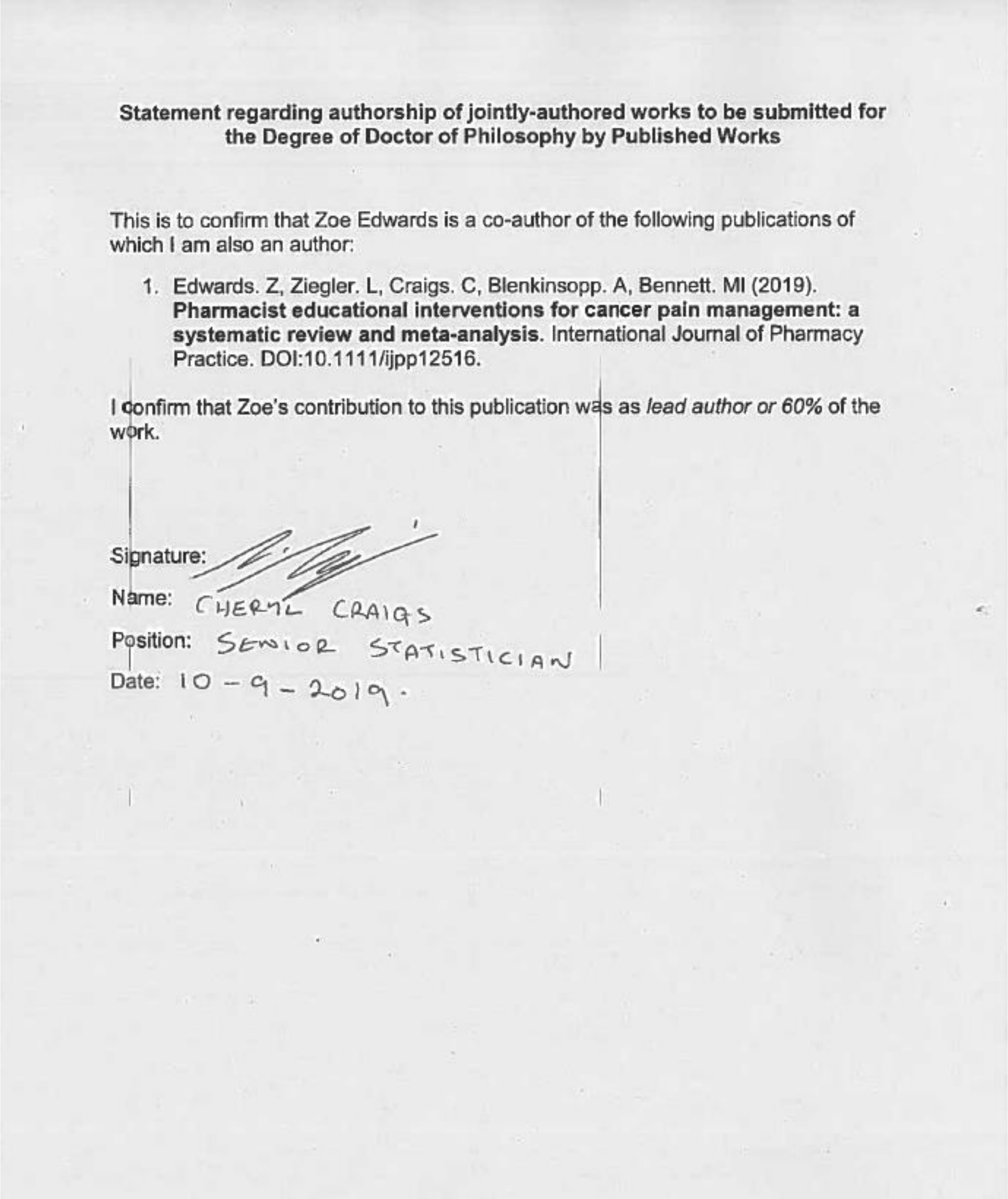
I confirm that Zoe's contribution to this publication was as *lead author or 60%* of the work.

Signature:
Name: LUCY ZIEGLER
Position: Associate Professor
Date: 24/7/2019.

Appendix 8

Statement of author contributions

Cheryl Craigs



Statement regarding authorship of jointly-authored works to be submitted for the Degree of Doctor of Philosophy by Published Works

This is to confirm that Zoe Edwards is a co-author of the following publications of which I am also an author:

1. Edwards. Z, Ziegler. L, Craigs. C, Blenkinsopp. A, Bennett. MI (2019). **Pharmacist educational interventions for cancer pain management: a systematic review and meta-analysis.** International Journal of Pharmacy Practice. DOI:10.1111/ijpp12516.

I confirm that Zoe's contribution to this publication was as *lead author or 60%* of the work.

Signature:

Name: CHERYL CRAIGS

Position: SENIOR STATISTICIAN

Date: 10 - 9 - 2019.

Appendix 9

Statement of author contributions

Duncan Petty

Statement regarding authorship of jointly-authored works to be submitted for the Degree of Doctor of Philosophy by Published Works

This is to confirm that Zoe Edwards is a co-author of the following publications of which I am also an author:

1. Edwards. Z, Bennett. MI, Petty. DR, Blenkinsopp. A. **Evaluating the effectiveness of recruitment methods of patients with advanced cancer.** Accepted by the International Journal of Pharmacy Practice May 2019.

I confirm that Zoe's contribution to this publication was as *lead author or 60%* of the work.

Signature: D R Petty

Name: Dr Duncan Petty

Position: Research Practitioner in Primary Care Pharmacy, University of Bradford

Date: 11th September 2019.

Appendix 10

Medicines Optimisation - Interview Topic Guide

Improving the management of pain from cancer in the community

(IMPACCT)

This is an interview as part of the IMPACCT Research Programme at Bradford, Leeds and York Universities. We are trying to improve the quality of life of patients with advanced cancer and their carers. There are several parts to the research but this one is focusing on using Pharmacies and their services to help patients

Theme	General Questions	Prompt items	Asked
General	• Tell me a little about yourself/yourselves	- Diagnosis - Family and Friends (support network) - Education/work history *See if education/work backgrounds have an effect on attitudes and behaviours*	
Current interaction with pharmacy	• Talk me through the way you get your pain medication	- Who looks after medication? - How do they obtain it? - Who organises (repeat prescriptions/dosette box?) - Have they ever had any problems in obtaining pain meds and how were they resolved? - *Sometimes patients may deal with all medication themselves and are v. knowledgeable or sometimes a carer or*	

	• Tell me about your pharmacy • If you ever have any problems using your pain medication or problems in how effective it is – what do you do?	*family member takes partial or full control of it. The pharmacy may put meds in a dosette box and its delivered periodically or they may have to order new items when they need them.* - Regular/non-regular use - Reasons and barriers (convenience/ stock issues) - Relationships with pharmacist/staff - Any problems they have encountered *Looking at what motivates them to use a particular pharmacy.* - Who do you talk to/ask? - Do you seek help? - Does the issue generally get resolved? *How does the patient deal with worries/ problems/ concerns. Do they act upon them, if so how. Do they just do what “they are told”. Do they know where to go for help? Do they know what information sources are available to them?*	
Services	• Did you know that Pharmacies offer services to patients on regular medication such as Medicine Use Reviews and for	- Explanation if required - Previous experience of services – good/bad/no experience	

	certain conditions the New Medicine Service?	- Was it whilst they had the cancer diagnosis *<u>Medicine Use Reviews</u> – where a pharmacist sits down with a patient and goes through the medication they are taking and helps with any medication they have. A consent form is usually signed for this and the pharmacist will usually fill a form in* *<u>New Medicine Service</u> – where a patient is prescribed a medicine (from a specific list) and after counselling signs a consent form and either comes back into the pharmacy or receives a telephone call to check that there are no problems with the medication. There maybe more than one phonecall and the pharmacist helps to sort out any problems with the new medicine.*	
Potential services	- What do you think about having a sit down with the pharmacist to talk through your pain medication and how you can get the most from it? - If you were prescribed a new medicine for pain relief how would you feel about the pharmacist ringing you after a week and then again after another week to see how you were getting on?	- How acceptable/helpful it would be - Any barriers - <u>Views on unconventional methods – telephone/skype</u>? - This maybe to providehelp with dose/side effects/ effectiveness etc - How much time commitment?	

		- Views on being contacted at home	
Patient Held Medication Record	- This is a draft copy of a pain medicines record that you could carry around with you between care settings which would detail your medicines and let professionals contact each other easily	- Show or let them see what is already included - Ask what other things might be useful - What would be less useful - Is there any other way the design could be more helpful to you? - Do you have any form of this already? - Should chemotherapy be included? *Information would be sourced from the GP record. This may help speed up appointments*	
Other ways pharmacy can help	- Do you think that there are any other ways that your pharmacist could help you manage your cancer and pain medications		

Thank you for your help with this research. When it is complete, you are welcome to have a copy of the final paper if you are interested. If you feel you would benefit from the Medicine Use Review service we mentioned you can ask at your regular Pharmacy, you may need to make an appointment or it may just be a walk in service depending on how it is staffed.