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Journal of Medicines Optimisation

Developing a patient-centred approach to get best outcomes and value from medicines

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- Adherence with Oral Chemotherapy in a Cancer Unit in Northern Ireland
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AIM OF THE JoMO

Medicines optimisation is a person centred approach to safe and effective medicines use to ensure that people obtain the best possible outcomes from their medicines. The aim of the JoMO is to contribute to that process and play an influential and key part in shaping better patient care and the role that medicines can play. The JoMO provides a vehicle to enable healthcare professionals to stimulate ideas in colleagues and/or disseminate good practice that others can adapt or develop to suit their local circumstances.

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The term medicines optimisation heralded in a paradigm shift that put patients at the heart of a process to ensure that they achieved the most benefit from their medicines. The establishment, by the Royal Pharmaceutical Society (RPS), of four guiding principles has proved to be a helpful framework to develop this patient-centred initiative. In this edition, we report on an interview with an architect of the RPS good practice guidance in which views about the future direction of travel are outlined. The author states that 'We are still coming to terms with whether we are a patient-facing profession.' That is a key aspect for pharmacy to address.

If patients are at the heart of medicines optimisation, we need to understand the outcomes and benefits that are important to them, the difficulties caused in their daily lives when things do not go as well as they might and how health professionals can make things better by improving their interactions with patients. When a health professional interacts with a patient, there is a focus on addressing a specific aspect at the time, such as their medicines. Circumstances will often limit the extent to which there is an understanding of the issues relevant to the patient in general and how they affect their daily lives. That is the purpose of our Patient Perspectives. In this edition a patient gives an invaluable insight into what it is really like living with chronic renal pain and related health issues.

Getting appropriate adherence by patients to medication regimes is a long-standing issue. This can be particularly critical for life-threatening indications such as chronic myeloid leukaemia. An article outlines the use of a standardised tool to assess compliance in such patients. The outcomes confirmed that compliance rates, in this particular situation, were favourably high. The use of the process in other locations will produce comparative information and either give assurance of the appropriateness of support locally or highlight where a change in the services and information provided to patients is needed.

The outcome of a process mapping COPD patient care pathways across primary and secondary care has led to a specialist pharmacists independent prescriber establishing clinics in GP practices. Impressive outcomes have been an improvement in symptom control, a reduction in COPD exacerbations and unplanned admissions as well as significant savings on the drug budget. It is a seminal piece of work that is reported here. Although it relates to COPD, it presents a model that could be adapted for other therapeutic conditions. The approach may be a useful model for other locations - it certainly illustrates the how pharmacy can clearly come to be seen as a 'patient-facing profession'.

HYPERLINKS

References and other resource material as appropriate can be accessed directly via hyperlinks in the Journal.

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WOULD YOU LIKE TO PUBLISH YOUR WORK IN THE JoMO?

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A Patient Perspective: Renal Pain

The process of medicines optimisation places patients at the heart of the process. It seems only right, then, to seek the views of patients about their experiences with medicines, their medical condition in general and their contacts with health professionals. Understanding what it is really like for a patient to live with a particular clinical condition will hopefully assist healthcare professionals to become more effective with their interactions and communications with patients and improve the healthcare services provided.

This has been done by providing patients identified through healthcare contacts with a template of questions to be completed anonymously by the patient on the basis that no individual be named or identifiable from the content.

About your medical condition

What is the medical condition that is most important to you and is being presented here?

Pain caused by my renal sludge and sometimes renal colic from gravel and stones. I have raised calcium and raised oxalate in my urine.

Can you please explain the problems you experience with this medical condition?

With my renal pain, I experience different types of pain. I can have full flank, excruciating pain and need paramedics with morphine, gas and air. At other times I just need some paracetamol and to manage the mild discomfort. I also carry dihydrocodeine and Oramorph but use the latter very rarely. I also carry Buscopan and that can be helpful when my pain becomes spasmodic. The biggest problem is not knowing when the pain will strike; it can and does happen at any time and has no sense of timing. I have had bad pain at almost any time of the day, in the middle of funerals and on flights on my way on holiday. Living with that uncertainty is very hard. Living with renal pain most of the time is also emotionally and physically demanding - it affects every part of my life.

From time to time I get scared - usually if the pain is extra intense or different in some way. It is at these times that I present at A&E. I go there for reassurance and to have my pain managed. I have had very variable care in A&E, mostly relating to the time it takes to get my pain under control. The issue is that, after more than 20 years, I manage to hold it together well most of the time so the staff, I believe, don't think I am a priority as opposed to someone who is shouting and crying. So there are times when, in A&E, I have to 'act up' to get the care I need. At other times, by the time I get to A&E I am too exhausted and can just about hold myself together.

Can you please say how the medical condition was first diagnosed?

Over 20 years ago, I went to my GP with white urine. I was sent to the GU Clinic and they treated me for NSU. I was then sent

to a pathologist and he then sent me on to a renal consultant. It all took a long time and it is only in recent years that the doctors have realised that I do drink enough fluid and this is a chronic condition.

Can you please say when the medical condition was first diagnosed?

I think I went to my GP for the first time in 1990 but the diagnosis took about 20 years to evolve into something which my GP and consultant understood.

If you look back, what would you say would be the main things you would have liked to have been different in terms of contact with health professionals, etc?

There are many examples.

The feeling of not being believed was awful for many, many years. From the doctor who accused me of being a drug addict to the consultant who made me feel like a failed experiment.

Having very good treatment in A&E and then, the next time, having to wait ages to get pain relief while all the time being in awful pain.

From the GP who scared me by shouting at me because I went to an emergency clinic as I needed more pain medicines to the wonderful GP who always genuinely asked me how I was and then went on to tell me how he admired me for coping so well.

The experience in A&E where they told me to take my own dihydrocodeine and tramadol, then gave me a script for Oramorph but, in the next breath, told me that the pharmacy was closed and I would have to return in the morning. Then they said that my local DGH would have Oramorph when the pharmacy opened at 9am but when I went it was closed all day (Sunday). I went to the Out-of-Hours GP service at the hospital and they exchanged my prescription for me.

About your medicines

Please list the medicines you taking for your medical condition:

- Paracetamol
- Buscopan
- Buccastem
- Dihydrocodine
- Tramadol
- Oramorph

Have the experiences you have had with your medicines been positive?

Please tick: No ✓ Yes

If you ticked 'No', please say how things could have been better:

As listed above, the process of getting Oramorph when I was in great distress with pain could have been better. The A&E must have had a duty pharmacist to call on but instead they wanted me to 'get through the night' on what I had.

No one should be expected to wait for pain medication, it is inhuman. The Out-of-Hours GP was wonderful and phoned the duty pharmacy to check they had Oramorph, they did and the pharmacist was very kind and talked me through how to take it. This was the first time in over 20 years that I had been given Oramorph to take home.

What have you found to be most helpful to you in terms of helping you take your medicines as intended?

Just the care and concern that the GP and the Pharmacist showed. The care in talking me thought how to take my medicine.

About the services you received

Have you had any negative experiences with the services you have received?

Please tick: No Yes ✓

If you ticked 'Yes', please say how things could have been better:

Another example was when I was in very bad pain with my spine in Manchester, the Out-of-Hours doctor called the Pharmacy to ask them if they would deliver tramadol to me. I could hardly move off the bed.

The pharmacy agreed and then later phoned to say they got the hotels mixed up and that they had thought that I was in a hotel very close to them. They refused to come across the city centre to my hotel and told me that I would have to pay £20 for taxis. They were aggressive and uncaring, it was all about the money; I paid as I had no choice.

What have you found to be most helpful to you in terms of the services you have received?

One time in hospital, a hospital pharmacist spent about 40 minutes with me going through my medication. It turned into a medicine use review but I learnt a great deal about my medicines. I was in for heart problems and it took my mind of what else was happening to me. The pharmacist was exceptionally kind and patient with me.

Have the health professionals you have come in contact with appreciated what it was like from your position as a patient?

There are great doctors, nurses and pharmacists out there but, regularly, I have to be quite assertive. I do this in a very nice way to get what I need and to explain what I think is happening, the reassurance I am looking for and how they can do that.

I think the other big issue is that, other than my GP, all my consultants are just dealing with their area. I have the following consultants: renal, cardiology, respiratory, endocrinology and ophthalmic. Then there are the medicines and how they interact!

Was the information you were given about your medical condition sufficient for you?

In the beginning 'no'. I spent years feeling not believed. How can someone have stones, gravel and sludge most of the time? It doesn't make sense, so he must be exaggerating. Even now, I sometimes get the feeling that, outside of my consultants, people don't quite believe I can have so much wrong at 44 yrs old.

Did the health professionals you came in contact with communicate effectively with you?

My experience over the years has been very variable.

There was the pain consultant who did some procedure with needles a foot long and a CT scanner (unpleasant even with sedation) and who, after, asked me 'Are you still in pain'. I said, 'yes' and he then said, 'well it didn't work then' and promptly walked away. I was in tears!

There was also the Occupational Therapist, who said 'no one can tell you that you are not in pain' - she was so kind and her words and genuine concern and care meant a great deal to me.

Then there was the lovely GP locum who showed a human side and was the first doctor ever to say 'I just don't know.' He showed me humility and a human side. He then said 'but let's find out together'. I really loved that GP and hated it when I moved home and had to find a new GP. I have a great GP now by the way!

What have been the best experiences you have had with the services you have received?

My current renal doctor is totally wonderful and very, very kind. He spends the time with me that I need. He explains things to me, even if he did the same last time. He has empathy and I hate the thought that he is in his 50s and will retire one day. He is 'A1'.

My GP is my rock, he shares all the attributes that my renal doctor has and he knows me well. The last time I went to see him, I went in with my little list (yes, I am organised). We worked through my list but there was something that came up that took some more time. At the end I apologised for taking so long and that I should have booked a double appointment. He smiled and said it was no problem, he saw I was on the list and gave me a double anyway! I roared with laughter and he said 'With all you are going through at the moment, I knew we would need a little longer'. I can't quite put into words what that meant to me but it meant a lot!

About other medical conditions

Do you have just one medical condition that make life problematic for you?

Please tick: No ✓ Yes

If you ticked 'No', please list the other medical conditions and explain the main problems you experience with each one:

Medical condition	Main problem experienced
Osteoporosis	Bone Fractures (3 in one fall in 2014)
Paroxysmal atrial fibrillation	Feeling faint, unwell, palpitations
Costochondritis	Very sore ribs
Early onset osteoarthritis	Painful joints all over my body
Asthma	Shortness of breath
Sleep apnoea	Sleep with CPAP
Gout	Part of my stone problem
GERD from taking Voltarol	Acid reflux
Chronic migraines	Feeling drunk, pain and jaw pain
Hearing Loss	Having to wear hearing aids
Constant tinnitus	Psychologically hard to adjust too

About going forward

What would you like to happen at this stage that would make living with your condition easier for you?

Easier access back to see my consultants when I need to see them. My GP can help by writing but it would be so much better if I could just phone or email their secretaries to get questions answered or to get back to see them in clinic.

My local hospital has been having huge problems in this area and it can take 6 months to get to see someone even when you are in the system.

If you could give a brief message to healthcare professionals, what would it be?

Show you are human, show you care, be humble, be reassuring, ask what the patient needs from you, be kind.

Please add any other comments or observations that would be helpful to health professionals who are responsible for providing services for you.

Patients on the whole do know that you are busy, that you see many people in a day and that can be stressful. If you can do one thing it is, as I said before, be human. Show you care - the vast majority of people came into medicine because they wanted to help people. If you came in to just make money, then it is time to re-examine your motives.

Declaration of interests

In the spirit of being open and transparent, would you please disclose any payments, interests or activities that could be perceived as influencing what you have written.

I don't think I have any but I am a judge for the Grunenthal Pain Awards and did receive a payment to cover my lost earnings during judging. I was also offered a fee by Pharmacy Management to complete this questionnaire within a defined timescale.

Royal Pharmaceutical Society Principles of Medicines Optimisation

Interview with **Catherine Picton**, *Lead author, RPS Principles of Medicines Optimisation and Healthcare Consultant*

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Interview conducted by **Barry Jubraj**, *Clinical Senior Lecturer (Medicines Optimisation), King's College London*

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How did you get involved in developing the RPS guidance on medicines optimisation?

In the last fifteen years of my career I have specialised in the development of guidance that helps translate policy into practice. Much of my work has touched on problems and issues around the use of medicines in practice and medicines optimisation, for example shared decision-making, transfer of care and local decision-making processes.

Although there is a lot of evidence that patients experience problems with their medicines, relatively little research exists around how patients actually use their medicines in practice. In other words, we're not good at looking at what patients do once they have their medicines. NHS England wanted to tackle this and medicines optimisation was seen as a way to do so. As a result, I was asked by the RPS to lead on the development of this guidance as a way to capture some principles for medicines optimisation.

How did you find doing it e.g. consulting with stakeholders, managing a variety of views, and settling on the principles that are mentioned?

The start was to look at literature and practice. I wanted to elucidate a narrative. There wasn't a definition of medicines optimisation but there were plenty of examples of it in practice as well as all the examples of the problems that sub-optimal use of medicines caused for patients and the system. I looked at the problem from both sides in order to pull out the principles.

It was an iterative process using expert groups and focus groups. Interestingly, participants tended to want to define medicines optimisation before the principles were identified. I resisted this because of the danger of a definition limiting our thinking. It wasn't too tortuous a process because we knew what the problems were and also what the evidence was. The principles aren't complicated but they illustrated the problems. We tried to keep it simple.

You drew on your experience of previous projects for this work. Were there any differences?

Yes – there are always differences. This was simple and complex at the same time; keeping things simple is often much more difficult than putting in a lot of detail. The need to look at this in a very multidisciplinary way and with an absolute focus on patients added complexity and I was struck by the pressure to get it right.

Were there any 'lightbulb' moments or things that stand out?

I think it helps to see medicines optimisation as a way of thinking about medicines for their whole journey, the way they are researched, commissioned, prescribed and used. There had been a mindset of looking at medicines in isolation, often focusing on them as a cost pressure rather than looking at getting best value and outcomes for the patient. For me, the real challenge for all healthcare professionals is in Principle 1, having an ongoing, open dialogue with the patient and/or their carer about the patient's choice and experience of using medicines to manage their condition. It sounds straightforward but it's a change in mindset.

Do you think that medicines optimisation can avoid being a 'fad' and can it be here to stay?

At a national policy level, medicines optimisation has been driven and, I have to say, embraced by NHS England. They can see the potential to improve patient outcomes and to promote the best use of medicines. There is a common cause with the pharmaceutical industry where we need to ensure that appropriate innovations are used and also a common cause with the RPS – hence the guidance document. It has come to be accepted at the strategic and practical levels.

I don't see any sign of the commitment to medicines optimisation diminishing. We have the medicines optimisation dashboard and

other practical tools. It is important to link the principles to implementation, measurement and monitoring; particularly at a local level. Local policies are needed to win hearts and minds and to embed medicines optimisation organisationally.

In hospital pharmacy we see systems change happening and there is strong leadership there that, if harnessed, could really help drive medicines optimisation.

Where do we as a profession need to go next with medicines optimisation?

There is a huge issue around system leadership and pharmacists truly owning medicines optimisation. It is everyone's business. We need to equip local leaders and the RPS leadership framework is important here along with links to the NHS Leadership Academy. Pharmacists ranging from Trust Chief Pharmacists to community and practice pharmacists and CCG pharmacists need to be relentless in recording and measuring their work and taking a leadership role. The medicines optimisation dashboard can help. The February 2016 report of Lord Carter's review of productivity in acute trusts in England is a good example of where we need local leadership in ensuring that the local plans being developed as part of the Hospital Pharmacy Transformation Programme have a focus on medicines optimisation and the clinical services that are required to support delivery.

There is a tailwind around medicines optimisation at the moment on which pharmacists need to capitalise. It is absolutely clear that NHS England and the Department of Health sees a future for pharmacists and their teams in providing clinical services to patients. What the pharmacy profession needs to do urgently is to capitalise on this view and ensure that medicines optimisation activities are firmly integrated into any transformation plans or local development.

It is also important to communicate effectively with patients, which we're not so good at right now. We are still coming to terms with whether we are a patient-facing profession. Community pharmacists need to spend more time with patients, but this is hard. Yet community pharmacists' added value is when they are with patients e.g. helping with adherence and MURs. This is where we add value.

If a community pharmacist asked 'give me one thing I could do to move forward with medicines optimisation', what would you say?

I would say audit how much time you spend with patients in comparison with your other activities. See how your system works and explore possible changes. Identify where you can claw time back e.g. through skill mix. If you are an employee pharmacist, this will be harder. Can you realise efficiencies from the medicines process?

I think it is clear that to secure future roles we need community pharmacists to focus much more on clinical and medicines optimisation roles. This is something that was highlighted in the RPS Commission report 'Now or Never: Shaping Pharmacy for the Future' and is becoming increasingly urgent.

How would you like medicines optimisation to be taught in pharmacy?

I think that there needs to be greater effort in equipping pharmacy teams to communicate with patients, including health literacy, adherence and health coaching. One-to-one clinical engagement and consultation needs to improve.

Barry described that Kings College London have two health psychologists and run consultation skills training from year 1:

CP: This teaching shouldn't be an add-on in year 3 just before placements. Pharmacists need to be very self-aware and able to engage on a human level.

Barry described a student told on his Saturday job by a pharmacist not to talk to patients – just dispense:

CP: That's not surprising given the historical funding model for community pharmacy, although I think we can now see that there is already pressure on that funding model. We mustn't lose sight of the way that the profession dispenses safely for patients. But the 'Now or Never' report is clear about how pharmacy needs to change. We need to tell pharmacy students that the future is clinical and skill mix is a key to this. We need to be realistic about the future pressures and tell them about new roles that are emerging. Community pharmacists need to fight for and embrace clinical practice.

We need to train clinical leaders who will take ownership on patient issues, cascade that training and act as role models. We need these leaders to say 'this is about the patient'. These may be in LPFs. It may be a community pharmacist who owns a patient's problem about, for example, a 'special' and communicates with the hospital and the GP. This is a system leader.

LPCs can support, for example 'Community Pharmacy West Yorkshire' is well set up doing good work in establishing systems and processes. For example, a common ailments service that is commissioned and co-produced with GPs within the system. It's about co-ordination, communication and, importantly, implementation; this is the thing we fall down on too often - great ideas not implemented well.

The NHS has fragmented systems around medicines and needs leadership.

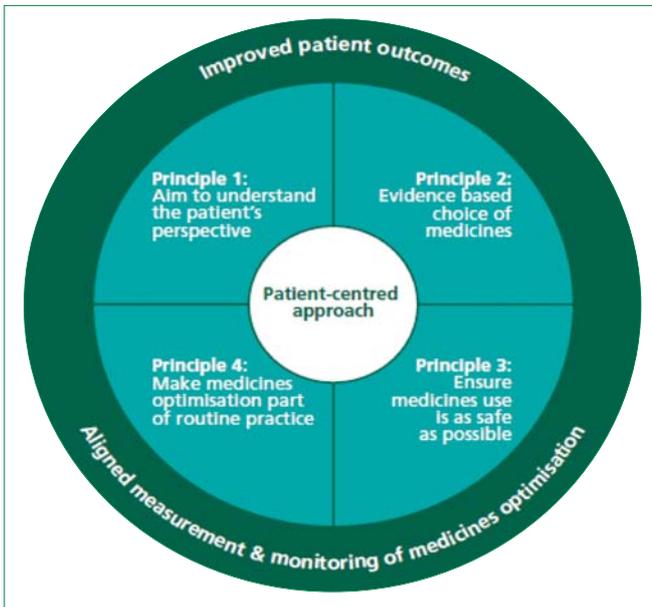
Declaration of interests

The author and the interviewer have nothing to disclose.

Editorial notes

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- Medicines Optimisation Dashboard. Available at: <https://www.england.nhs.uk/ourwork/pe/mo-dash/> .
- RPS Medicines Optimisation principles



- Terminology:
 - RPS – Royal Pharmaceutical Society*
 - CCG – Clinical Commissioning Group*
 - MUR – Medicines Use Review*
 - LPC – Local Pharmaceutical Committee*
 - LPF – Lead Provider Framework*

Adherence with Oral Chemotherapy in a Cancer Unit in Northern Ireland

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Abstract

Title

Adherence with Oral Chemotherapy in a Cancer Unit in Northern Ireland.

Author list

Doyle C, White S, Mills L.

Introduction

Studies in Chronic Myeloid Leukaemia (CML) have shown that adherence to oral chemotherapy is fundamental in achieving good responses where better adherence (>90%) is critical in achieving a major molecular response.

The aims of this study were to establish the level of adherence to oral chemotherapy of patients with malignancy, to determine how patients feel about the level of support they are provided with at the start of and during their therapy and their knowledge and beliefs regarding their treatment.

Methods

The Morisky 8-item questionnaire was initially used to measure adherence in 21 oncology and haematology patients. Patients then subsequently indicated their beliefs and knowledge of their medication through an interview.

Twenty one were included in the study. Patients had a diagnosis of breast cancer, colorectal cancer or myeloma and were receiving oral chemotherapy for this indication.

Results

One hundred per cent of patients had median or high levels of adherence and there was no significant difference in levels of high adherence between genders or disease groups.

Conclusion

The data from the interviews suggest that patients and relatives are satisfied with the information provided to them from healthcare professionals. Patients are knowledgeable regarding the aims of treatments, dosing and side effects. However, many patients rely on their relatives to remind them to take their medication, thus patients who lack this support may benefit from further pharmacy input to ensure that they take their medication appropriately.

Keywords: non-adherence, CML, leukaemia, Morisky Scale, questionnaire, interview, patients.

Introduction

Over the past decade, there has been a large increase in the use of oral chemotherapy agents to treat malignancies. Over 50% of novel anti-cancer agents are available as an oral formulation.¹ Oral therapies are more convenient for patients; they reduce the incidence of extravasation, allow for greater flexibility, help with capacity planning and are associated with a better quality of life. The two main disadvantages are cost and patients' adherence to therapy.²

Adherence is influenced by many factors. The World Health Organisation³ divides these factors into five groups, including condition/disease and patient related.

Adherence is defined as the extent to which a patient achieved in accordance with the prescribed interval and dose of a drug regimen.⁴ Optimal adherence is when patients do not miss doses, nor include extra doses but take the correct quantity at the correct time of day.

Several reports have been published endeavouring to improve adherence. For example, the National Collaborating Centre for Primary Care (NCCPC) published a Medicines Adherence report in 2009 where suggestions included increasing patient involvement in the decision making process regarding treatment and understanding patients' knowledge, beliefs and concerns about medicines.⁵

A review by Partridge et al illustrates varying degrees of adherence rates in respect of cancer patients including 53-98% in breast cancer and 17-27% in haematological malignancies.⁶

Adherence levels can range anywhere from 20 to 50% in chronic disease⁷ but it is thought that adherence is higher in cancer patients due to the consequences of non-adherence or poor adherence. Poor adherence is associated with poorer response to therapy within cancer; this has been observed mainly in chronic myeloid leukaemia (CML) where good adherence is critical in achieving a molecular response.⁸

One study investigating adherence in myeloma found that approximately one third of over 300 patients being treated with thalidomide or lenalidomide for induction were non-adherent; with thalidomide having a slightly higher percentage (37% vs 33%).⁹

A Spanish study found adherence levels with capecitabine for oncological malignancies of 93%¹⁰ even with the complex dosing and directions for patients. Non-adherence was linked to forgetting to take medication and/or side effects. Partridge et al found adherence of 78% to capecitabine in breast cancer patients.⁶ Patients with the less aggressive node negative disease and mastectomy were more likely to be non-adherent. Age and disease-related properties did not predict adherence.¹¹

Another concern associated with oral chemotherapy is over-adherence, which can lead to increased toxicities especially of grade III or IV that may subsequently lead to dose reductions or cessation of treatment. In a phase II study comparing capecitabine to capecitabine in combination with sunitinib for metastatic oesophageal cancer, 75% of patients described adherence as 'always or almost always' even though they were experiencing grade III+ toxicities.¹²

The management of adverse effects can have a crucial impact on adherence. Decker et al studied symptom management strategies and reported a 23% non-adherence rate to oral chemotherapy due to forgetting to take the medicines or due to side effect symptoms (N = 30).¹³

A pivotal study of adherence to oral chemotherapy in oncology and haematology was the 'Happy Club' concept for patients treated with imatinib for CML.¹⁴ Patients randomised to the Happy Club had comprehensive counselling which included the importance of adhering to medication, quality of life and regular BCR-ABL and cytogenetic monitoring. This arm was also given periodic telephone counselling. Patients in the Happy Club arm of the study were more compliant when compared with patients who did not receive the intervention (P=0.001).

No study has been undertaken which has looked at adherence to oral chemotherapy in Northern Ireland. Patient opinion on the support provided to them or their views on how healthcare professionals could help them with their adherence has been reported.

Aims

The aims of the study were to investigate the level of adherence to oral chemotherapy of Northern Health and Social Care Trust patients diagnosed with malignancy, determine how patients feel about the level of support and information they are given at the start of and during their treatment and establish if patients believe that there are any further interventions which could improve adherence levels in cancer patients in the Trust.

Methods

Study Design

The different methods for measuring adherence can be sub-classified into direct or indirect. No method is considered to be the gold standard measurement and all have their own individual advantages and disadvantages. Direct methods include directly observed administration whilst indirect methods include questionnaires and self-reporting.¹⁵

The Morisky Scale is a widely used convenient tool to measure adherence. It was first developed in 1986 where four simple questions were used to assist in measuring adherence.¹⁶ The test was trialled in essential hypertension and patients who scored higher (better adherence) had their blood pressure under significantly better control at 2 and 5 years (P<0.01).

Qualitative research was used in this project as the opinions of patients on the support that they believe they get from the healthcare professionals within the department and their views and beliefs on taking medication were sought.

Patients and recruitment

The study was conducted between March and May 2014 in Laurel House Chemotherapy Unit, Antrim Hospital. Each patient's consultant was asked by the Cancer Services Pharmacist to confirm if the patient was a suitable participant for the study and if they agreed, the patient was asked to participate. Approval for the study was obtained from the Trust's Research Governance department as a service evaluation project. No patient refused to participate in the study and no patient was deemed unsuitable for the study.

Interviews used open non-leading questions and these were developed from a review of the literature and study aim. Subsequent questions were added to clarify or explore the responses given. Interviews were transcribed verbatim.

Patients participating in the study included those:

- diagnosed with adjuvant or metastatic colorectal cancer and receiving capecitabine which may be in conjunction with intravenous chemotherapy
- diagnosed with metastatic breast cancer and receiving capecitabine
- diagnosed with Multiple Myeloma and receiving thalidomide or lenalidomide.

All other patients were not eligible for inclusion.

Data collection

Each patient's level of adherence was measured using the Morisky 8 item questionnaire (MMAS-8).

Patients' attitudes and beliefs on the aims of their treatment, views and opinions on support and education given to them, side effects from these medicines and methods which they would consider useful to improve adherence were then discussed using a semi-structured interview with the patient and their relatives, if applicable. The first part of the interview focused upon their views on the support they were given at initiation and throughout their treatment time. The second part of the interview considered the patients' knowledge of their therapy, for example, aim of therapy, knowledge of medicines they take and administration directions. The last part focused on how they remember to take their medicines; for example, do they have any method of remembering to take them?

Interviews were conducted by the Cancer Services Pharmacist and data was collected until saturation.

Data analysis (Morisky questionnaires)

Relevant statistical analysis was performed on the data to compare:

- low, medium and high adherence
- high adherence between males and females
- high adherence between the three different disease groups.

Interviews and thematic analysis

After collation of the data, analysis was carried out using the six phase process described by Clarke and Braun.¹⁷

Results

Demographics

A total of 21 patients were included in the study. The median age was 68 years, (range 48- 85 years) and the mean total length of time for each introduction, questionnaire and interview was 24 minutes.

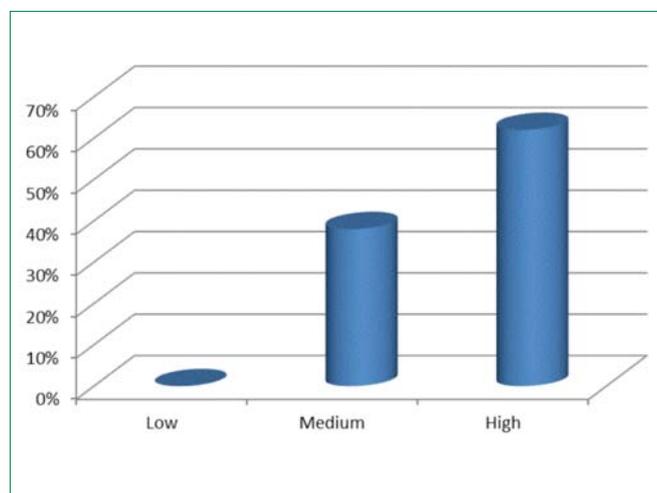


Figure 1: Comparison of levels of adherence in all patients (P=0.19)

All patients were white and of Northern Irish background. Nine (43%) were male and twelve (57%) were female.

Six patients (29 %) had a diagnosis of colorectal cancer, six patients (29 %) had a diagnosis of metastatic breast cancer and nine patients (42 %) had a diagnosis of myeloma.

For the purposes of data analysis, it was assumed that $\alpha = 0.05$ throughout. Low adherence was defined as MMAS-8 = 0-5, medium adherence as MMAS-8 = 6-7 and high as MMAS-8 = 8.

Using the Morisky 8-item Medication Adherence Questionnaire, the majority of patients (n= 13; 62%) had high adherence whilst 38% (n=8) recorded a score in the medium adherence range. No patients had low adherence scores. See Figure 1.

Gender

Seven female (58%) patients had high adherence scores whilst 6 male (66.67%) had high adherence scores. See Figure 2.

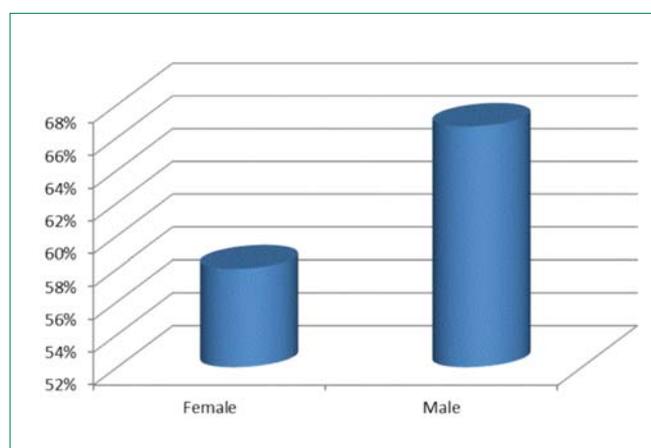


Figure 2: High adherence comparison between genders (P=0.87)

Type of treatment/diagnosis

Fifty per cent (n= 6) of colorectal cancer patients had high adherence scores whilst 66.67% (n=6) of breast cancer patients and 66.67% (n=9) of Myeloma patients also had high adherence scores.

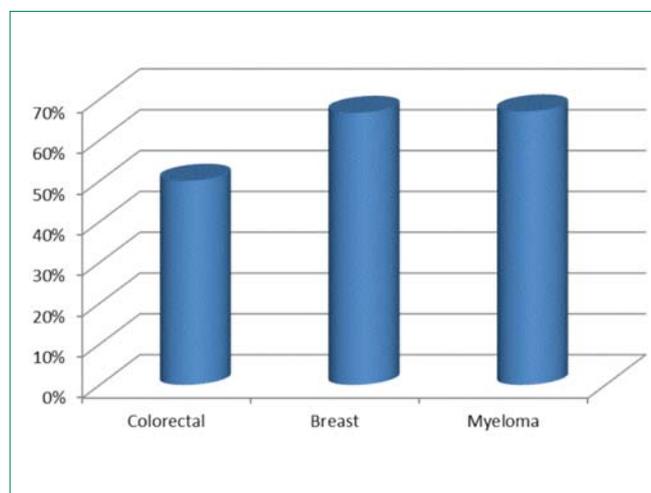


Figure 3: High adherence comparison between diseases (P=0.97)

Themes from Interviews

At the outset, seven main themes emerged from the interviews and these are discussed below.

* Theme 1 - Explanations/Information/Support

All patients were satisfied with the support, counselling and information that they were given when they commenced treatment and on subsequent occasions if required. Only one patient said that the amount of information was too much at the start of treatment but they did admit that they felt frightened commencing treatment and the written information was beneficial for domiciliary use.

"I found the information provided by the nurse to be very useful. She explained it very well too."

* Theme 2 - Knowledge and aims of treatment

Patients were aware of the goal of their specific treatment. Many of the patients receiving thalidomide used the word 'remission' when discussing the aim of treatment for them whilst patients receiving lenalidomide were aware that the main aim was stable disease. All patients with metastatic breast cancer knew that the treatment objective was to prolong their life rather than cure them. The relevant colorectal cancer patients who were receiving capecitabine after successful surgery were also aware of this. Patients were also aware of the dosing and directions for their medication:

"With my chemotherapy tablet, I take it for 2 weeks then have a week break before I come back up here..... I take it after breakfast and dinner."

* Theme 3 - Beliefs

Two patients receiving capecitabine for colorectal cancer were receiving the therapy following successful surgery and the treatment was to err on the side of caution. Both patients had high adherence and they stated that although the medication was more of a preventative treatment, they still took it as prescribed as they wanted to make sure that they were doing the best for themselves and that the consultants advised that they have the treatment:

"I take all my tablets religiously. It's probably a generation thing."

* Theme 4 - Experiences

Two patients were able to associate their diagnosis and need for chemotherapy to a past/recent experience with a relative. For example, one lady remarked that her father was able to go about his normal daily living whilst on treatment. A female patient receiving capecitabine for metastatic breast cancer who had numerous lines of therapy did remark that she preferred intravenous to oral chemotherapy as she experienced less side effects with the former:

"My dad had chemo a few years and just got on with it so I'm trying to do the same."

* Theme 5 - How to remember to take chemotherapy medicines

In this study, 'remembering' could be subdivided into:

- habit
- family support
- reminder tools (various methods).

Many patients relied heavily on family support to remind them to take their medicines:

"If I wasn't here, he would never remember to take them."
[patient's wife]

* Theme 6 - Preferences

Patients did not want to get involved in the decision-making regarding their treatment. Many commented that they trusted their consultant's decision as they are the 'experts'. With regards to the form of chemotherapy, most patients expressed the view that they preferred oral tablets/capsules as they considered it to be more convenient:

"I get my tablets and go straight home."

* Theme 7 - Extra support and suggestions

No patient thought that support telephone calls from healthcare professionals would be beneficial to them. Patients commented that they are fully aware that they can contact the unit if they have any issues and they are all given contact details when treatment was initiated. The daughter of one patient who lives with her mother and organises her medicines stated that reviews would be a "waste of resources", she would rather "nurses were doing their jobs of treating patients." However, this service may be beneficial for low adherers or patients with no/little domestic support. It may also help manage and identify toxicities.¹⁶

One carer suggested that technology will be useful for reminding patients to take their medicines in future generations as the current elderly population in Northern Ireland is not as 'au fait' with technology when compared with younger generations.

Another male patient stated that he would prefer to see the same clinician at each visit as this person knows him and his disease:

"I prefer to see Dr X each time as he knows all about me."

Discussion

Morisky questionnaires

This was a relatively small study that indicated that patient adherence in these patients was generally good. There was no difference in the level of high adherence between genders or disease groups.

The results on adherence in myeloma patients (haematological malignancy) contradict those found by Partridge et al⁶ as the results described above show that patients with a haematological malignancy are as adherent as their oncological counterparts whereas Partridge et al found that adherence in that group to be only 17-27%. The results on breast cancer adherence are similar to those found by Partridge et al.

From the quantitative part of the project, it would have been useful to have had more patients participating.

Only three groups of patients were included in the project; a larger study including patients with more diagnosis could be considered.

The project was single centre and did not take into consideration socioeconomic background. All patients were of Northern Irish descent so no comparison between ethnicities was possible. Further, patients with no domestic support were not identified during the duration of the project.

Interviews

Patients generally reported that the information and support that they were given at the start of treatment was appropriate. They were all given the opportunity to ask questions if they had any concerns and a number commented on the usefulness of the written information provided for home use.

Patients were aware of the directions for taking their medicines including dosing and dietary or time of day recommendations. They were also conscious of the aim of treatment including female patients receiving capecitabine for metastatic breast cancer who were mindful that their disease was now at an incurable stage.

Regarding beliefs associated with taking medicines, the views in this study are similar to patients prescribed medicines to prevent cardiovascular disease where most patients trusted the judgement of their physician due to their knowledge of health and the relevant disease.¹⁸

Much of the literature regarding methods used to assist patients to remember to take their medicines concerns Medi-Dose boxes. MacLaughlin et al reviewed the different technological aids to help patients (based upon elderly group) to take their medicines.¹⁹ The authors comment that trials are required to assess and compare the different aids.

Patients also retain much of the information that they are given by their consultant and nurse at the start. The use of the terms 'remission' and 'written information' is language used within the department by healthcare professions.

Conclusion

Cancer patients in Antrim Hospital treated with oral chemotherapy appear to demonstrate good or high levels of adherence.

The duration of treatment had no impact on adherence and patients who receive treatment until disease progression were still aware that they need to take their medicines as prescribed. Adherence was higher in patients receiving capecitabine for metastatic breast cancer (treat until disease progression) in comparison to those receiving it for colorectal cancer (finite number of treatment cycles).

There was no significant difference in the level of adherence between males and females and the three disease groups analysed.

The patients felt that the support, information and advice they were given was acceptable and the written leaflets supplied supplemented what they were told by the various healthcare professionals.

Patients were also aware of who to contact when they experience any difficulties, the aims of their treatment and many have their own novel way of remembering to take their medicines or the support of family helps many.

All patients take their oral chemotherapy as they follow the advice of their consultant and trust their expertise; this decision is not influenced by stage or type of disease.

A larger study comparing adherence levels with oral chemotherapy in all malignant diseases is a potential next step. Again, as there is a heavy reliance on family/relatives to remind patients; another potential project is to investigate levels of adherence in patients who live on their own and methods which may assist those with adherence issues to take their medicines appropriately.

Declaration of interests

The authors have no competing interests to declare.

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Medicines Optimisation Outreach Case Management Clinics for COPD Patients

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Abstract

Title

Medicines Optimisation Outreach Case Management Clinics for COPD Patients.

Author list

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Introduction

In line with the Global Initiative for Chronic Obstructive Lung Disease (GOLD) strategy and 'Transforming Your Care' (the restructuring of healthcare provision in Northern Ireland), this project brought specialist respiratory pharmacist case management medicines optimisation clinics to COPD patients in primary care.

Methods

Further to a process mapping event attended by stakeholders from both primary and secondary care, clinics were initiated within GP practices. After initially determining the patient's expectations of the consultation, the independent prescriber pharmacist determined disease classification (GOLD grade), assessed medication adherence, established COPD medication appropriateness, recorded and graded clinical interventions made using the Eadon criteria reflecting significant improvement in standard of patient care, prescribed COPD medications and smoking cessation support accompanied by education, determined whether antibiotic prescribing for infective exacerbations was according to guidelines and made appropriate referrals to other healthcare professionals in both primary and secondary care (respiratory specialist review, spirometry, pulmonary rehabilitation, smoking cessation). Patients were case managed for 30 days post baseline clinic with outcomes determined at six months post baseline clinic attendance. Net drug cost savings from the primary care drug budget were determined via reference to the NHS Dictionary of Medicines and Devices (dm+d).

Results

Patients seen over a six-month period (n=658) demonstrated statistically significant improvements in COPD medication appropriateness and adherence, and improvement in COPD symptoms at 30 day telephone follow-up. Primary care guideline-informed antibiotic prescribing improved whilst annual net drug cost savings from the primary care drug budget were £244k. Results at six months post review indicated reduced COPD exacerbations and reduced related unplanned hospital admissions with continued improvement in appropriate antibiotic prescribing in response to sputum sampling (78.7% versus 97.8% adherence to guidelines from baseline to six months post review).

Discussion and Conclusion

Providing specialist hospital pharmacist patient centred case management clinics for COPD patients in the GP practice setting resulted in safe and cost-effective medication use with improved patient outcomes and positive stakeholder feedback.

Keywords: Respiratory Pharmacist, COPD, case management, outreach clinics, medicines optimisation.

Introduction

Chronic Obstructive Pulmonary Disease (COPD) as defined by GOLD¹ (Global Initiative for Chronic Obstructive Lung Disease) is a common preventable and treatable disease characterised by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases. Exacerbations and comorbidities contribute to the overall severity in individual patients.

By 2002, COPD was the fifth leading cause of death in the world² with the economic burden being substantial and still increasing; by 2030 it is expected to rise to the third global leading cause of death.³ Whilst exposure to tobacco smoke remains the most recognised risk factor for the development of COPD, other risk factors include exposure to indoor/outdoor/occupational air pollution,⁴ increasing age,⁵ genetics (a severe hereditary deficiency in alpha-1 antitrypsin),⁶ and socioeconomic status.⁷

The relationship to increasing age is of concern within the Western Health and Social Care Trust (WHSCT), which serves a population of approximately 300,000 people with the number of people aged ≥ 65 accounting for 12% of these. Statistics relating to population projections show an overall increase of 34% in the number of people aged 65 and over and living in the Western area by 2017. This represents the largest single increase of any Health and Social Care Board area in Northern Ireland and is significantly above the projected average increase for Northern Ireland as a whole.⁸

Diagnosis and Management of the COPD Patient

In the 2016 update of the GOLD global strategy for the diagnosis, management and prevention of COPD, it was acknowledged that, in the past, COPD was viewed as a disease mainly characterised by the symptom of breathlessness. However, it is now recognised that COPD has multiple symptomatic effects and, for this reason, a combined assessment of symptoms [using the Medical Research Council (MRC) scale⁹ and the COPD Assessment Test (CAT)¹⁰], exacerbation risk and comorbidities is recommended.¹

Medicines Optimisation and Integrated Care of the COPD Patient

A report by the American Thoracic Society on the 'Integrated care of the COPD Patient' stated that optimal management of COPD patients requires a holistic approach encompassing three key elements:

1. Recognition and treatment of all aspects of the disease, its systemic effects and co-morbidities
2. Bringing together all the dimensions of COPD care in a continuum through the lifetime of the patient
3. The integration of medical care among healthcare professionals and across healthcare sectors using a patient-centred approach.

Additionally, they stated that optimal management requires provision of the *right treatment* at the *right time*, and in the *right place*.¹¹

In June 2011, the Minister for the Department of Health, Social Services and Public Safety (DHSSPSNI) announced that a Review of the Provision of Health and Social Care Services in Northern Ireland would be undertaken; this review resulted in the publication later that year of The Compton Report 'Transforming Your Care (TYC)'. Twelve major principles for change were identified including:

- placing the individual at the centre of any model by promoting a better outcome for the service user, carer and their family
- using outcomes and quality evidence to shape services
- providing the right care in the right place at the right time (as also previously recommended by the American Thoracic Society)¹¹
- integrated care – working together
- promoting independence and personalisation of care.¹²

Further to the publication of the National Institute for Health and Care Excellence (NICE) definition of medicines optimisation¹³ and the four guiding principles developed by the Royal Pharmaceutical Society Great Britain in 2013,¹⁴ the DHSSPSNI launched a consultation on a Medicines Optimisation Quality Framework. This was officially launched in March 2016 and recognises that success in medicines optimisation is reliant on multidisciplinary teams with the correct skill mix working collaboratively.¹⁵

The holistic and patient-centred approach of these aforementioned recommendations and policies led the team to develop this project using an integrated approach to medicines optimisation at the primary/secondary care interface with seamless links being developed between the teams in these two settings.

Case Management

The term 'case management' originated in the USA where it was used interchangeably, often by healthcare researchers, with the term 'discharge planning'.¹⁶ The King's Fund have reported that the lack of a single UK definition for case management has led to confusion about what it actually entails but, after reviewing the available literature, they concluded that the following core components are particularly important to case management programmes:

- case-finding
- assessment
- care planning
- care co-ordination.

This can include, but is not limited to:

- medication management
- self-care support
- advocacy and negotiation
- psychosocial support
- monitoring and review
- case closure (in time-limited interventions).

The King's Fund recognised that this categorisation might suggest that case management is a linear process with sequential elements, but in reality, it is a much more complex process.¹⁷

Previous work in the Trust where older patients were case managed by a consultant pharmacist in intermediate care demonstrated that this approach resulted in more appropriate medication prescribing, reduced healthcare resource usage and associated drug cost savings.¹⁸ Therefore, it was decided that the case management approach would also be adopted in this project.

Method

Process Mapping and Development of a New COPD Patient Care Pathway

In order to visualise the existing Trust COPD patient care pathways between acute and secondary care, a process mapping event was held (July 2014). This event was attended by the Respiratory Consultant, Respiratory Registrar, Head of Pharmacy & Medicines Management, Advanced Specialist Respiratory Pharmacist, Consultant Pharmacist (older people), Research Pharmacist (Project Manager), Clinical Pharmacy Development Lead, Respiratory Ward Pharmacist, Respiratory Ward Technician, Early Supported Discharge Respiratory Nurses and the Directorate Support Manager (TYC).

It became apparent that placing the Trust pharmacist into primary care could potentially create access to those COPD patients most in need of review, education and intensive healthcare input. Following consultation with local GP practices on the feasibility of placing the specialist independent prescriber pharmacist within their surgeries, a new model of GP based care was developed; this integrated with care provided in primary care by GPs, practice nurses and the Community Respiratory Team (CRT) enabling more seamless access to secondary care. Figure 1 shows the new model, together with interventions made and outcomes measured, where patients were case managed for 30 days and followed up by telephone 30 days post review.

The Respiratory Pharmacist-led Clinics

A band 8a Specialist Pharmacist with an independent prescribing qualification was recruited to deliver the new service to all GP practices in the locality that were willing to engage. Eligible patients were identified using the GP COPD Quality and Outcomes Framework (QOF) register and invited to attend a 30 minute consultation and review service with the pharmacist. At the outset, the pharmacist set the scene, explained her role and established the patient expectations of this review. Patients were then comprehensively reviewed to ascertain the following:

- Confirmation of clinical diagnosis.
- Assessment of past and future exacerbation risk.
- COPD specific symptom scores.
- Appropriateness of COPD therapies.
- Medication adherence and reasons for unintentional/intentional omission of therapies.

The pharmacist educated the patient on their condition, explained their disease classification and the most appropriate medication changes to be made. With consent, these were implemented and reassessed at the 30 day telephone follow-up review.

Data Collection

Relevant baseline demographic and medical data were recorded for all patients seen by the pharmacist from December 1st 2014 to May 31st 2015. This was entered into the Statistical Package for the Social Sciences (SPSS) Version 22 for exploration and analysis. Clinical Interventions were recorded and self-graded by the pharmacist according to Eadon criteria;¹⁹ a score from 1 to 6 where ≥ 4 indicates a significant improvement in standard of patient care. Net cost savings were calculated via referral to the most recent edition of the BNF and cross-referenced with dm&d²⁰ (NHS dictionary for medicines and medical devices). Follow-up data on COPD related unplanned hospital admissions, exacerbations, antibiotic prescribing and sputum sampling (where applicable) were obtained from computer-held records and directly from the patient.

Medication Adherence

Adherence to COPD treatments was quantitatively established at baseline via pharmacist questioning using the 4-item Morisky Medication Adherence Scale (MMAS-4).²¹ This scale yields a score from 0-4, with 0 indicating non-adherence and 4 indicating full adherence to medicines prescribed. This was assessed by the pharmacist again 30 days post review. Repeat prescription fills on the GP system were also assessed in line with this. Open-ended probing questioning was employed to further explore reasons for intentional/unintentional non-adherence as indicated by the MMAS-4 score. A case management medicines optimisation care plan was developed to address any issues identified.

Medication Appropriateness

Appropriateness of COPD medication prescribing was determined using the Medication Appropriateness Index (MAI) at baseline and 30 days post review.²² Caution was exercised when interpreting this as the scale was developed and validated in the older population (≥ 65 years). However, the 10-item questionnaire is highly reflective of those questions which should be asked by a pharmacist when conducting a medication review, encompassing ascertainment of clinical indication, appropriate dosing schedule and cost-effectiveness, amongst others. The resulting score ranges from 0 to 18 with a high MAI score indicating less appropriate prescribing.

Symptom Assessment

The MRC⁹ and CAT¹⁰ scores were measured at baseline and 30 days post review. The MRC is a score of 1 to 5 with 1 representing a patient who is not troubled by breathlessness except on strenuous exercise, whilst 5 is indicative of a patient who is too breathless to leave the house. The content of the CAT questionnaire comprises eight simple questions and has a scoring range of 0 to 40. The recommended cut point for CAT is a score of 10 with those patients scoring less than 10 experiencing less impact of COPD on their quality of life. A drop of two units is suggestive of a meaningful difference in symptoms.²³

Spirometry

Spirometry reports were reviewed at baseline to assist with confirmation of clinical diagnosis and ascertainment of GOLD classification. Where reports were unavailable, or of questionable quality, repeat spirometry was undertaken.

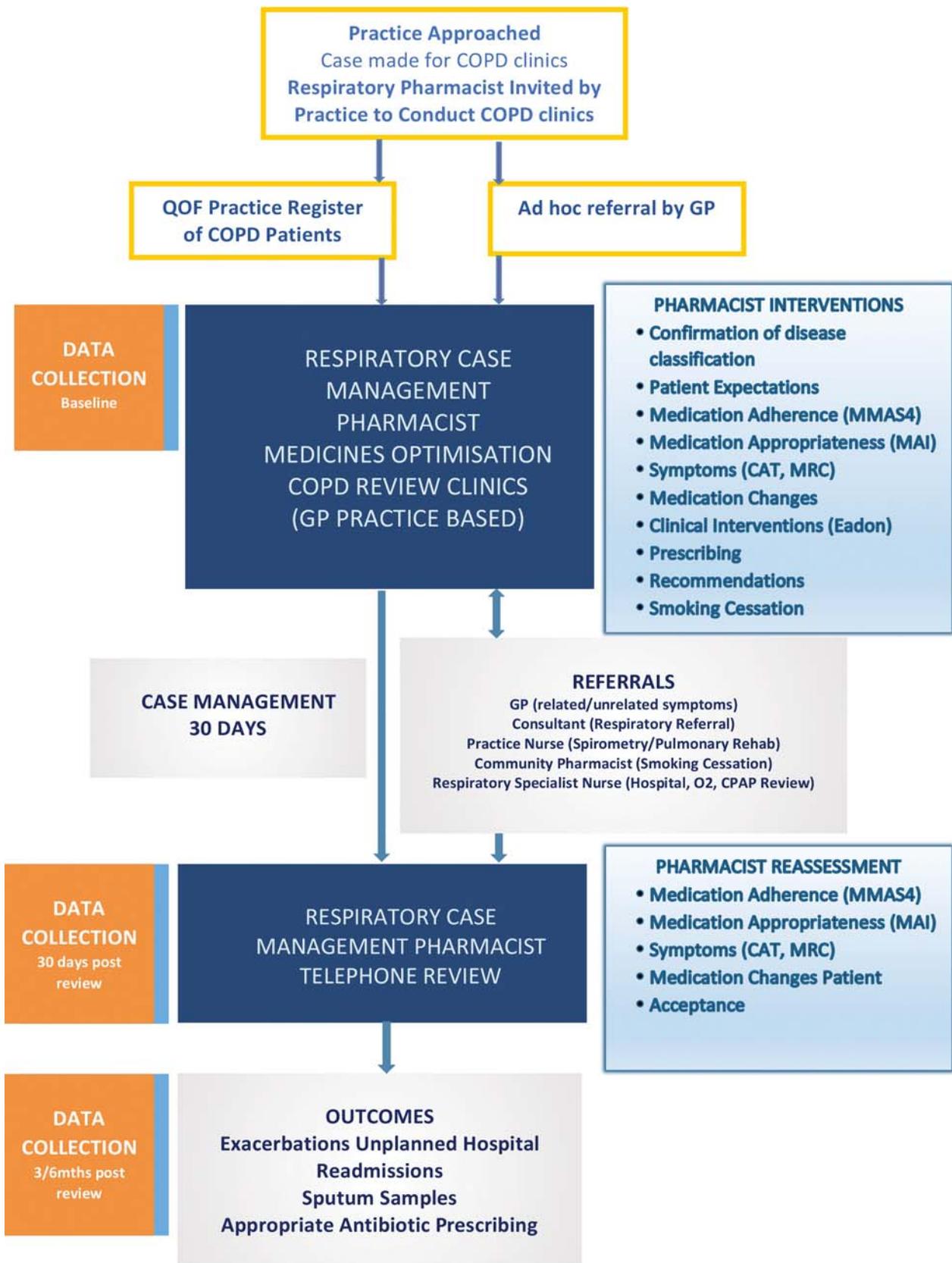


Figure 1: New model of care for COPD patients attending a medicines optimisation GP-based clinic

Patient Experience Measurement

Evaluation of the patient experience was retrospectively considered by the team during this ongoing project. To enable measurement of this outcome, moving forward with the work, a Patient Experience Questionnaire (PEQ) was given to 30 patients not included in the original cohort between July and September 2015. This 18-item self-reported PEQ is a reliable, validated measure of patient experience suitable for measuring the outcomes from a one-to-one consultation. While it was developed for use by doctors, the questions are generic enough that it could be easily adapted to be used by other health professionals.²⁴

Governance and Ethics

The proposed model and method of evaluation was assessed by the Trust research director who deemed this work to be service development and evaluation, not requiring research governance or ethical permissions.

Results

Over a period of six months, the respiratory pharmacist held clinics with 658 patients (326 male, 332 female, aged 66.1±11.0 years (range 30-92 years). Twelve patients were lost to follow-up, therefore outcome data is presented for 646 patients.

Disease Status: Gold Classification

Patients had their FEV1 recorded at baseline. Based on this, the GOLD classifications were established. Table 1 shows the results where 80.4% of patients were categorised as GOLD 1-2.

Patient History of COPD Exacerbations, Sputum Sampling and Unplanned Admissions

Almost two-thirds of patients (65.3%) had experienced one or more COPD exacerbations in the 12 months prior to clinic attendance (range 1-12).

The number of sputum samples taken over this time period ranged from 0-25 per patient (median = 1, n=95). Forty-seven patients were prescribed antibiotics in response to their sputum results with the most appropriate antibiotic being prescribed for

GOLD Classification	Number of Patients	% Patients
GOLD 1	147	22.3
GOLD 2	382	58.1
GOLD 3	109	16.6
GOLD 4	16	2.4
Not known	4	0.6
TOTAL	658	100

Table 1: GOLD classification of severity of airflow limitation at baseline of patients seen by the respiratory pharmacist

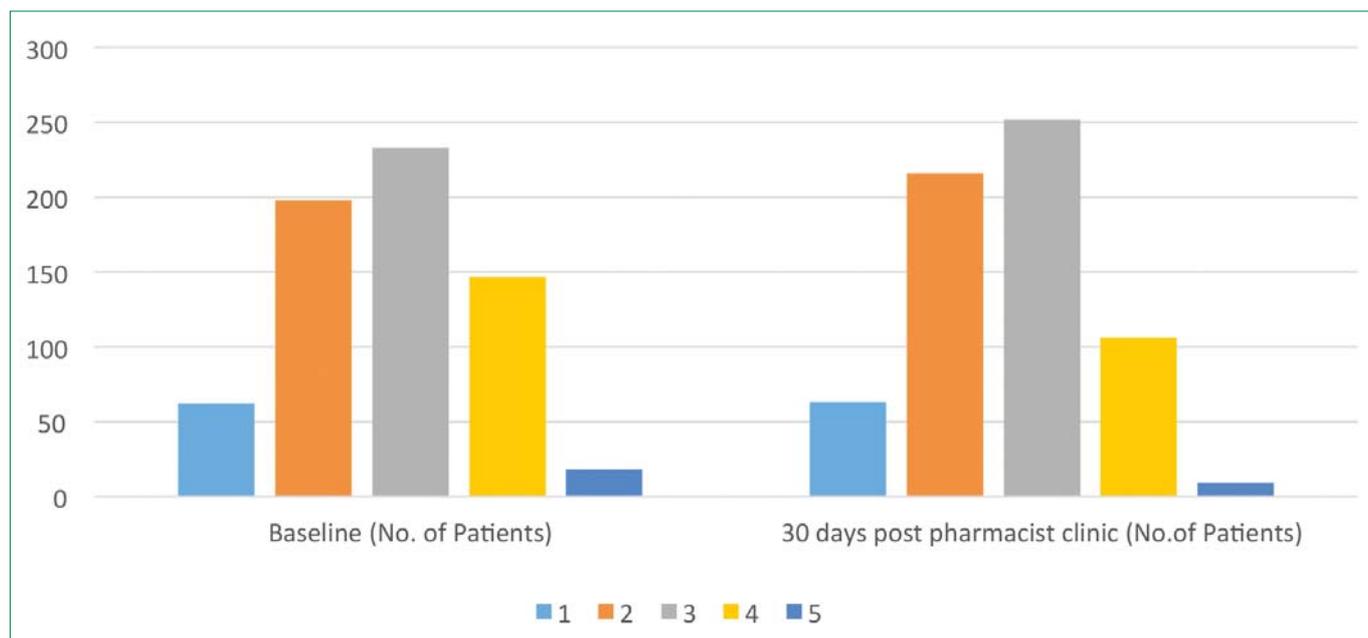


Figure 2: Change in the MRC breathlessness score at baseline and 30 days post review

78.7% of patients (n=47), thereby indicating less appropriate antibiotic prescribing for approximately one in five patients requiring treatment. Fifty-five patients (8.4%) had experienced an unplanned admission to hospital in the year prior to the clinic.

MRC Breathlessness Score

Figure 2 illustrates the statistically significant drop in MRC Breathlessness Score from baseline review, to 30 days post pharmacist review [2.8 ± 1.0 (n=658) versus 2.7 ± 0.9 (n=646), Wilcoxon Signed Rank Test, $p < 0.001$].

COPD Assessment Test (CAT score)

CAT scores at baseline were 11.0 ± 6.7 (n=658) versus 9.4 ± 5.6 (n=646) after 30 days representing a statistically significant drop (Paired sample t-test, $p < 0.001$, n=646), with the average score dropping below the recommended cut point of 10. (Table 2)

Spirometry

Five patients were found to have a diagnosis of COPD with no spirometry having ever been performed. Sixty-six patients needed repeat spirometry with a further 28 requiring formal reversibility testing to confirm or rule out a concurrent diagnosis of asthma.

Smoking Status

Two hundred and sixty-nine patients (40.9%) were current smokers whilst just over half of the patients seen were former smokers (n=339); fifty patients had never smoked.

When appropriate, patients were given smoking cessation advice, with the long-term effects of continued smoking being clearly explained from a number of viewpoints (disease progression/daily symptoms/infection risk/Quality of Life). Nicotine Replacement Therapy (NRT) was prescribed by the pharmacist for patients willing to set a quit date. This was just eight patients, however all were still engaging with smoking cessation after 30 days.

Remaining patients were signposted to community pharmacy led cessation services and other community based established schemes.

Twenty-five patients explicitly declined cessation advice on the basis that they had no future intentions to stop, irrespective of all information provided.

CAT Score	Baseline (prior to pharmacist review and case management, n=658)	No. of patients (%) 30 days post pharmacist review (n=646) No. of patients (%)
<10	314 (47.7)	372 (57.6)
10 or more	344 (52.3)	274 (42.4)

Table 2: Baseline COPD Assessment Test (CAT) scores for medicines at baseline and 30 days post review and case management

Total MAI Score for COPD medications		
Baseline (prior to pharmacist review)	Immediately post pharmacist review	30 days post review by pharmacist
7.8 ± 6 (n=658)	1.0 ± 1.9 (n=658)	0.44 ± 1.4 (n=646)

Table 3: Total MAI scores for patients prior to, immediately after and 30 days post review

MMAS-4 Score	No. of Patients (Baseline prior to review & pharmacist interventions) (n=627)	No. of Patients (30 days post pharmacist review and case management) (n=622)
0	22	0
1	43	2
2	96	16
3	145	50
4	321	554

Table 4: Morisky Medication Adherence Scores (MMAS-4) for patients taking ≥ 1 COPD medications at baseline

COPD Medicines

The number of medicines taken by patients to treat their COPD at baseline was 2.7±1.4 (range = 0-9). Immediately following review, this figure dropped to 2.5 ±1.3 (range = 0-9), a statistically significant reduction which was maintained when patients were reviewed 30 days later (p<0.001, paired samples t-test, n= 645).

Medication Appropriateness

Table 3 summarises the MAI scores for COPD medicines as determined by the pharmacist at: baseline prior to review; immediately after review; and 30 days post review and case management. Total MAI scores reduced immediately following review, with this improved upon even further 30 days post-review (Wilcoxon Signed Rank Test, p<0.001, n=646).

Medication Adherence

The move towards better adherence with COPD medicines was highly statistically significant (Wilcoxon Ranked Sign Test, p<0.001, n=622). (Table 4)

Clinical Interventions

An average of 2.85 clinical interventions was made per patient with the respiratory pharmacist self-grading 1600 interventions as Eadon grade 4 (85.3%) and 275 (17.7%) as grade 5. An example of a grade 4 and a grade 5 intervention are shown in Table 5.

Drug Cost Savings

The projected annual saving within the primary care drug budget after COPD medication review and case management by a respiratory specialist pharmacist was £244k pa, an approximate £4.14 return per £1 invested in the employment of a Band 8a pharmacist (based on an annual investment of £59k). The drug cost savings were achieved via more appropriate prescribing including a reduction in ICS/LABA dosing and general frequency, reduction and elimination of nebulised and oral bronchodilators, elimination of inhaled antimuscarinics and reduction/elimination of prophylactic antibiotics and oral steroids.

GP Referrals

Fifty-nine COPD patients were referred by the pharmacist to their GP. Thirty-four of these referrals were respiratory-related including referral to secondary care for Chest x-ray/6-min walk/overnight

oximetry. The remainder had other relevant clinical issues including anxiety and pain management. Additionally, antibiotic prescribing was requested in response to pending sputum sensitivity results.

Other Referrals

Fifty-seven patients were referred to Specialist Oxygen nurses. Reasons for this included patient unsure about terms of use, therapy had originally been initiated in primary care (now restricted to specialist assessment only), not recently reviewed and uncertainty regarding genuine need. The Pulmonary Rehabilitation service was offered by the pharmacist to all eligible patients (15%). Other common referrals included those to the practice nurse for vaccines and up-to-date bloods (68 patients); these patients had originally been lost to follow-up and were now re-engaged appropriately in the healthcare system.

Patient Experience Questionnaire

All patients (n=30) surveyed reported an improved understanding of how to manage their breathing problems in the future. They felt that important decisions were made collaboratively and they had a chance to ask questions and discuss their condition and its treatment; they were now less worried, relieved and strengthened by the changes made to their treatment and the advice given to them by the respiratory pharmacist.

Six-month Outcome Data

During the six month follow-up period, 37.5% of patients had experienced an exacerbation (range = 1 to 4) with frequency of exacerbations also being reduced from the 12 months prior to review (range =1 to12). Sputum sampling was suitably ordered; in response to sensitivity results, antibiotic prescribing in line with current guidelines increased from 78.7% to 97.8%. Fifty-five patients (8.4%) had been admitted to hospital during the year prior to the review clinic. At six months follow-up, 3.2% of patients had been admitted non-electively to hospital with a COPD related diagnosis.

Stakeholder Feedback

GPs and Practice Managers from practices involved in the project have positively welcomed the pharmacist-led COPD clinics with many recommending the service to colleagues who then approached and requested the service from the Trust. Feedback received included:

Clinical Intervention	Eadon Grade
Discontinue theophylline No clinical indication: moderate breathlessness MRC 3 Not on maximal inhaled therapy and no significant inflammatory symptoms No Therapeutic Drug Monitoring (TDM) since commencing Possible drug-related side-effects: intermittent headache and nausea	4
Withdrawal of PPI and start bisphosphonate On high dose maintenance PPI for many years with no indication Frequent infective exacerbations – 7 antibiotics in past 12 months, therefore high risk of <i>C.difficile</i> 4 oral steroid courses in past 12 months, therefore risk of reduced Bone Mineral Density History of one mechanical fall with fracture	5

Table 5: Clinical intervention examples and Eadon grade

"The GPs and practice nurses will be using your history taking and recording as an example for quite some time."
(Practice Manager E-mail to pharmacist)

"...I think it has been very successful from a prescribing point of view" (GP E-mail to Respiratory Consultant)

"...patients offered very good feedback and she was an exceptionally professional lady who offered great support to our staff and nurses. Both our nurses had identified asthma and COPD as areas they would like to evolve and improve. They feel this was achieved. We look forward to improving our COPD register and improving the quality of care to our patients." (GP letter to Respiratory Consultant).

Discussion

In addition to establishing the impact of an intensive review and medicines optimisation service to COPD patients by a specialist respiratory pharmacist, with respect to many outcomes including improved medication adherence, improved appropriateness of prescribing and patient education, significant findings were also made in relation to the original disease diagnosis and subsequent treatment.

Five patients had a diagnosis of COPD without spirometry testing whilst the spirometry reports for a number of other patients had questionable interpretation; this has highlighted the issue of incorrect interpretation of spirometry tests and consequent misdiagnosis in primary care to the Trust, which is consistent with national findings.²⁵ A business case has therefore been established for a Respiratory Physiologist to be sent into primary care to both conduct spirometry and train practice staff to ensure enhanced quality of testing and more accurate test interpretation. Accurate spirometry testing would ultimately ensure correct diagnosis and suitable application of an appropriate level of treatment to prevent over-treatment.

The six-month follow-up data highlight significant learning by other healthcare professionals as demonstrated by the; improvement in sputum sampling and appropriate antibiotic prescribing according to primary care antimicrobial prescribing guidelines. Further learning was in relation to the correct interpretation of spirometry readings and responding to anomalies (in particular restrictive profiles), the importance of collaborative history taking to include a full review of childhood and family health status (in addition to past and present occupational risks) and application of the correct choice and level of treatment to maximise the potential for effective longer-term management and minimise associated drug-related spend. The project team originally set out to deliver a more holistic review service to COPD patients by integrating the secondary and primary care teams. In so doing, demonstrable patient and healthcare resource outcomes were achieved, thereby supporting the need to further develop, replicate and evaluate the case management approach as a future model of care.

Conclusion

The introduction of Trust outreach medicines optimisation case management clinics to GP practices has resulted in many positive outcomes, all of which sit neatly within the patient-centred ethos of integrated care and medicines optimisation, with benefits for both patients and healthcare staff working collaboratively across the healthcare delivery interfaces.

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Declaration of interests

The authors of this paper have nothing to disclose.

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