Comorbidities

Clinical decision support for patients with comorbidities

A collection of papers exploring how clinical decision support needs to support patients with comorbidities by Dr Kieran Walsh.

bestpractice.bmj.com/info/comorbidities

Foreword

The purpose of clinical decision support is "to translate knowledge into evidence-based practice in clinical settings."[1] Clinical decision support can improve healthcare in a range of ways. It can reduce medical errors; it can ensure that healthcare professionals follow guidelines; and it can also save costs.[2]

However until now, clinical decision support has only helped with the management of patients with single conditions. This is useful but it misses out large sections of the population who have multiple conditions. One in four adults now have two or more conditions.

Remarkably, in the UK, one in three adults admitted to hospital as an emergency have five or more conditions. People with multimorbidity have poorer functional status, quality of life, and health outcomes, and are higher users of ambulatory and inpatient care than are those without multimorbidity. They also have a higher mortality.

When comorbidities aren't taken into account, patients get suboptimal care leading to worse clinical outcomes. Comorbidities also associated with longer lengths of stay. This all poses a significant problem for health systems But resources for healthcare professionals focus only on single conditions.

There is now a great opportunity for clinical decision support to help with the management of patients with multiple conditions. This collection of papers imagines a future world where clinical decision support will support the provision of holistic care. The papers touch on many of the issues already mentioned as well as a variety of other hot topics in this field. These include the impact of comorbidities on the cost of healthcare, the importance of chronic non-communicable diseases (such as diabetes), and patient perspectives on the need for holistic care. The papers also outline how certain comorbidities – such as mental health conditions – are commonly overlooked and the effect this can have on clinical and financial health outcomes (such as length of stay). Inevitably it also looks at the impact of COVID-19 on the health service and the fact that it is patients with comorbidities who are most severely affected by this disease.

These problems have driven us to develop our own clinical decision support tool – BMJ Best Practice. The Comorbidities tool from BMJ Best Practice now enables evidence-based management for patients with comorbidities. The new comorbidities tool from BMJ Best Practice allows healthcare professionals to add a patient's comorbidities to an existing management plan and get a tailored plan instantly. It thus supports healthcare professionals to treat the whole patient when managing acute conditions. We have developed this resource with users in the UK and internationally. You can **access the content here**. If you have suggestions on how it could be further developed or improved, we would be delighted to hear from you – please email on kmwalsh@bmj.com.

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The cost of comorbidities

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Comorbidities have a range of effects on patients. Patients with comorbidities are associated with increased morbidity and mortality; they often have poorer functional status and quality of life, and they are higher users of care than are those without multimorbidity. These human costs of comorbidities could not be more serious for patients. They clearly outweigh any financial costs associated with comorbidities.

The financial effect of comorbidities on healthcare systems

Yet the financial costs of comorbidities cannot be ignored. These costs will have an effect on healthcare systems and ultimately on patients and populations: healthcare budgets are always finite and spending in one area will inevitably affect spending elsewhere. Comorbidities obviously have a financial cost - but all involved in healthcare spending will be keen to find out exactly what is this cost and how the costs might be spread over different budgets. And of course, whether cost savings are possible. The following papers provide answers to these questions - specifically, as they relate to chronic obstructive pulmonary disease (COPD).

Costs and comorbidities in patients with COPD

Deniz et al. recently published a paper that looks at costs and comorbidities in patients with COPD.[1] They found that comorbidities "have an important role in the total costs of acute exacerbations of COPD" and conclude that "strategies for the prevention, diagnosis, and effective management of comorbidities would decrease the overall financial burden associated with acute exacerbations of COPD." They suggest that better management of the most common comorbidities (such as diabetes, hypertension, heart disease, and depression) might significantly reduce the cost of exacerbations. Staying with the subject of COPD and cost and comorbidities, Kirsch et al. examined the economic impact of COPD and its comorbidities in patients on a disease management programme.[2] They found that the severity of the COPD was directly associated with increased costs and that the presence of comorbidities had an additional significant and independent effect on costs. One final study of the economic burden of COPD and comorbidities was published by Mannino and colleagues.[3]

Chronic kidney disease and anaemia are associated with the highest costs

They found that "high resource use and costs were associated with COPD and multiple comorbidities." Comorbidities in their study included cardiovascular disease, diabetes, asthma, anaemia, and chronic kidney disease. Chronic kidney disease and anaemia were associated with the highest costs.

These are just a few sample papers - but they all reach similar conclusions. Cost and comorbidities seem to be inextricably linked in this common condition. Anything that can help with the management of comorbidities in COPD are likely to significantly improve care and save costs. These are the reasons that we have launched the Comorbidities tool from BMJ Best Practice. The purpose is improved management of patients with comorbidities, and we would be delighted to hear from you if you had suggestions on how we could help.

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Length of stay, comorbidities and mental illness

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Prolonged length of stay in hospital is important for a number of reasons. It results in distress, discomfort and inconvenience for patients. There is an increased risk of nosocomial infections and over treatment. It also results in increased costs to healthcare providers. Yet prolonged length of stay is not an easy problem to solve. Part of the problem is that discharging patients earlier can result in readmission - with an even longer length of stay and even higher costs.

Multimorbidity contributing to prolonged length of stay

Another means of tackling the problem is to look at what is causing the prolonged length of stay and see if anything can be done about these causes. Multimorbidity is certainly an issue that can cause prolonged length of stay but much of the literature in this regard focuses on chronic non-communicable physical diseases. There have been remarkably few studies on how comorbid mental illnesses can affect length of stay.

This is all the more reason to look closely at the study by Siddiqui and colleagues which looked at exactly this problem.[1] The study looked at hospital patients with lung or colorectal cancer, chronic obstructive pulmonary disease (COPD), type 2 diabetes, ischaemic heart disease, and stroke. They found that patients with mental health issues illness "incurred higher bed days' use than for those without mental illness." They looked at a range of different mental illnesses including disorders due to psychoactive substance use, schizophrenia, mood disorders, and neurotic, stress-related & somatoform disorders. They found that mental illnesses consistently resulted in prolonged length of stay.

The need for more integrated care models and the upskilling of staff

The authors of the study draw a number of conclusions. They state that there is a need for more integrated care models so that patients with physical and mental illnesses will receive better care. They also call for upskilling of staff so that they are better equipped to care for such patients.

Upskilling of staff will be difficult to achieve in traditional face to face settings in light of current pressures on healthcare and healthcare professional education. It is for these reasons that BMJ has launched the new Comorbidities tool from BMJ Best Practice. This covers mental and well as physical illnesses and features important guidance for patients with physical illnesses who also have depression or dementia. There are multiple examples of this. To take just one example, certain patients with myocardial infarction may also have depression. This will mean healthcare professionals who are managing such patients will have to review any treatment for depression, monitor for hyponatremia, beware of drug interactions, and consider a referral to the liaison psychiatry team.

It is a lot to remember - which is why clinical decision support that works at the point of care and that provides guidance on how to care for patients with comorbidities is necessary.

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Multimorbidity in older people: the problem with diabetes

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Older people are more likely to have multiple chronic illnesses. This can result in increased utilisation of healthcare and increased costs. It can also result in inconvenience to the patient. If an older person with multiple chronic illnesses needs specialist care, it can mean visits to multiple different specialists.

A geriatrician may be able to care for patients with multiple illnesses – but it makes for an enormous challenge for one person to be cardiologist, neurologist, chest physician, oncologist, and diabetologist. If there were certain clusters of comorbidities in elderly people, it might make life easier for patients and doctors alike. So are there any such clusters?

Clusters of comorbidities in elderly people

Buja et al. have set out to answer this question.[1] They looked at the most common chronic conditions and their combinations in older people with complex health care needs. They found a number of disease clusters – or associations between different diseases. The clusters included metabolic-ischemic heart diseases, neurological and mental disorders; respiratory conditions; and cancer. There are multiple examples within the clusters – but one clear example is the clustering of ischemic heart disease and diabetes. So in this case, there is a clear need for physicians to carefully consider how they should treat a patient with a myocardial infarction who also has diabetes.

The challenge - most guidelines for treatment focus on single conditions

This is a challenge – as most guidelines for treatment focus on single conditions. At BMJ, we have been doing research on how doctors and other healthcare professionals want to learn about patients with multiple conditions. They have told us that they want specific guidance on patients with specific combinations of comorbidities. For example in the case of myocardial infarction and diabetes, they want to know how best to use a variable rate intravenous insulin infusion; when it might be necessary to stop metformin (such as in patients with renal impairment); when it might be necessary to stop sodium-glucose cotransporter-2 inhibitors (such as in acutely ill patients); and how to assess and prevent foot ulceration.

Improve quality and save costs

These strategies have the potential to improve quality and save costs in patients with diabetes. And the costs are significant. A recent paper from Stedman et al. showed that 17% of beds are occupied by patients with type 2 diabetes and 3% by patients with type 1.[2] The authors also found that the "overall cost of hospital care for people with diabetes is £5.5 billion/year".[2] They conclude "that supporting patients in diabetes management may significantly reduce hospital activity."

If you are interested in finding out more about BMJ's work in this field, then please get in touch on **kmwalsh@bmj.com**. We have just launched the Comorbidities tool from BMJ Best Practice for the better management of patients with comorbidities, and we would be delighted to hear from you if you had suggestions on how we could help.

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The hidden comorbidities

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When I talk to doctors about patients with multiple conditions, they all agree that it is a problem. When I ask what conditions are a particular problem, they come up with a list of usual suspects. They mention patients with COPD, heart failure and diabetes mellitus. Or patients with stroke, hypertension and ischemic heart disease. Or another overlapping cluster of chronic kidney disease, diabetes and hypertension. But only rarely do they spontaneously mention mental health conditions. When I suggest depression or dementia, they immediately agree that these are a problem also. But they don't get as much airtime as the other comorbidities.

Comorbid mental health conditions can have a real impact on clinical outcomes

This is unfortunate as comorbid mental health conditions can have a real impact on clinical outcomes. There are many examples of this. Frayne et al. showed that patients with diabetes and co-existing mental health conditions were less likely to receive the care that they should.[1] They were less likely to receive haemoglobin A1C tests, cholesterol tests, and eye examinations. This is worrying as these are the basics of diabetes care. The mental health conditions included depression, anxiety, psychosis, mania, substance use disorder, and personality disorder. In another study, Braunstein et al. showed that patients with heart failure and depression had a higher risk of hospitalisation and mortality.[2] There is also evidence that patients with COPD and depression have impaired quality of life and reduced adherence to treatment.[3] They are also more likely to suffer from fatigue.

Healthcare professionals find the management of comorbidities difficult

BMJ Best Practice is the clinical decision support tool of the BMJ. When we speak to users of the tool, they commonly state that they find management of comorbidities difficult. They worry that by treating one condition they might make another condition worse. And this includes mental health conditions. They need guidance on common problems, such as: how steroids can worsen symptoms of depression; or how antidepressants can exacerbate hyponatremia in a patient taking diuretics; or how sedative antidepressants may precipitate respiratory depression in a patient with COPD. Clearly it is imperative that patients with coexistent mental and physical health disorders receive adequate treatment for their mental disorder or physical disorder or both disorders. These are just a few sample papers - but they all reach similar conclusions. Cost and comorbidities seem to be inextricably linked in this common condition. Anything that can help with the management of comorbidities in COPD are likely to significantly improve care and save costs. These are the reasons that we have launched the Comorbidities tool from BMJ Best Practice. The purpose is improved management of patients with comorbidities, and we would be delighted to hear from you if you had suggestions on how we could help. Please email on **kmwalsh@bmj.com**.

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"They only look at the lungs – as if the patient had no other organs"

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Multimorbidity is a growing problem in healthcare. The ageing population in all societies means that this problem will only get worse. Yet patients with multimorbidity deserve the same high-quality care that other patients receive. Can we be confident that they are getting such care?

Schiøtz et al. have done an interesting study to attempt to find the answer to this question.[1] They reviewed the records of patients with multimorbidity and came up with some interesting findings. Worryingly they found that "the care provided to approximately two-thirds of the patients did not take comorbidities into account and insufficiently addressed more diffuse symptoms or problems." The problems with management were encapsulated in the title quote – where physicians focussed on a single disease or organ system – and ignored any problem that was outside of their specialist area.

We might well ask why this could be the case. Boyd et al. conducted another study that could help us answer this question.[2] They evaluated the applicability of clinical practice guidelines to the care of older individuals with several comorbid diseases. They found that most guidelines did not modify their recommendations when patients had comorbidities. Following several disease guidelines in a single patient with several diseases would also likely result in polypharmacy, drug interactions and increased costs - with little benefit to the patient.

Older patients with multiple chronic diseases have been most affected

These issues have become even more clear in the COVID-19 pandemic. It is older patients with multiple chronic diseases who have been most affected. But we all know that the problems with comorbidities have been around for a long time and that the medical community has been slow to respond.

Managing patients with multiple chronic conditions

BMJ Best Practice is the clinical decision support tool of the BMJ. Until now, it has addressed single conditions only. However, we are now evaluating a new solution that will enable healthcare professionals to better manage patients with multiple chronic conditions. Speaking to users has revealed a stark need for such a solution. One cardiologist recently told me that he could not remember the last time he saw a patient with a single condition. Speaking to patients can also be telling. One patient recently told me that he was the only patient on a hospital ward with a single condition. When his doctors were taking a history, they repeatedly asked him if he was sure he had no other illnesses. They were very much accustomed to looking at patients with multiple comorbidities. We have just launched the Comorbidities tool from BMJ Best Practice for the better management of patients with comorbidities, and we would be delighted to hear from you if you had suggestions on how we could help. Please email on **kmwalsh@bmj.com**.

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COVID-19 and the new Comorbidities tool from BMJ Best Practice

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42% of patients with COVID-19 had comorbidities*

There have been a lot of papers on COVID-19 and comorbidities. There are many anecdotal reports and some studies - but it can be difficult to pull them all together. This is all the more reason to look closely at the meta-analysis by Espinosa and colleagues who reviewed existing studies in their paper "Prevalence of Comorbidities in Patients and Mortality Cases Affected by SARS-CoV2"[1]. They found that 42% of patients with COVID-19 had comorbidities; 61% of those admitted to the Intensive Care Unit had comorbidities; and 77% of those who died had comorbidities. Hypertension was the most prevalent comorbidity (affecting 32% of patients). Other common comorbidities included diabetes (22%), heart disease (13%), and COPD (8%).

Inevitably there are some weaknesses in their paper. Not all included studies separated epidemiological and clinical data and not all described the exact diseases that constituted the comorbidities. Most of the studies that they looked at were in China where the pandemic started. However their findings are important and are broadly in keeping with subsequent studies and reports from other parts of the world.

One in three UK adults admitted to hospital as an emergency have five or more conditions

The findings are also in keeping with what we know about comorbidities outside of the context of COVID-19. We know that when comorbidities aren't taken into account, patients get suboptimal care leading to worse clinical outcomes. Comorbidities are also associated with longer lengths of stay. And comorbidities are common. One in four adults suffers from more than one condition and, in the UK, one in three adults admitted to hospital as an emergency have five or more conditions. People with multimorbidity have poorer functional status, quality of life, and health outcomes, and are higher users of care than are those without multimorbidity. This all poses a significant problem for health systems.

There has been little focus on treatment of comorbidities in patients affected by COVID-19

COVID-19 is a new disease and already there has been a great deal of research into new treatments and strategies for prevention. However, there has been relatively little focus on treatment of comorbidities in patients who are affected by the infection.

The Chief Medical Officer in the UK is Dr Chris Whitty - now a household name in this country because of the COVID-19 pandemic. Immediately before the outbreak, he wrote in The BMJ that despite the high prevalence of comorbidity "training from medical school onwards, clinical teams, and clinical guidelines, however, all tend to be organised along single disease or single organ lines."[2]

COVID-19 comorbidities highlighted by a new tool

At BMJ Best Practice, we agree and it is this thinking that led us to launch the new Comorbidities tool from BMJ Best Practice. The idea is that you can use the tool to add the patient's comorbidities to an existing management plan and get a tailored plan instantly. We have now incorporated the tool into our BMJ Best Practice topic on COVID-19. We have done this with our external expert panel and have found multiple instances where better treatment of comorbidities should prevent complications in patients with COVID-19.

For example, patients with COVID-19 and diabetes should have close monitoring of their blood glucose levels. This is especially so in patients who start on steroids. And of course, seriously ill patients should have careful monitoring to ensure that they don't get pressure ulcers. Patients with COVID-19 and heart failure also need to be managed carefully. This means close monitoring of fluid balance, avoidance of non-steroidals, and a review of all cardiovascular and renal medications.

We are glad to be able to make this resource freely available in light of the pandemic and we would be grateful for any feedback that you might have on the tool. Please email on **kmwalsh@bmj.com**.

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About Dr Kieran Walsh

Dr Kieran Walsh is Clinical Director at BMJ. He is the clinical lead of the medical education and clinical decision support products at BMJ. He has a vast amount of experience in online medical education, clinical decision support, face to face delivery of medical education, and both summative and formative assessment.

He has published over 200 papers in the biomedical literature and has published four books: the first and only book on cost effectiveness in medical education; a dictionary of quotations in medical education; a history of medical education in 100 images; and the Oxford Textbook of Medical Education.

He is a Fellow of the Higher Education Academy, a Fellow of the Royal College of Physicians of Ireland, a Fellow of the Academy of Medical Educators, and Adjunct Associate Professor at Monash University. In the past he has worked as a hospital doctor specialising in General Internal Medicine and Geriatric Medicine.

About BMJ Best Practice Comorbidities

BMJ Best Practice Comorbidities is the only point of care tool that supports the management of the whole patient by including guidance on the treatment of a patient's acute condition alongside their pre-existing comorbidities.

To find out more visit **bestpractice.bmj.com/info/comorbidities** or contact **sales@bmj.com**.

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