



**Medical students and the management of patients with multiple complex conditions: the role of BMJ Best Practice Comorbidities**

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## Summary

BMJ Best Practice Comorbidities has been designed to help medical students and postgraduate healthcare professionals better manage patients with multiple health conditions. In this evaluation, we used simulated scenarios to assess the usefulness, usability and effectiveness of BMJ Best Practice Comorbidities.

Twelve medical students in their final and penultimate years took part in the simulated scenarios. Each student took part in two scenarios and each scenario lasted 20 minutes. We found that BMJ Best Practice enabled the medical students to arrive at the correct treatments for the patients in simulated scenarios, and that the Comorbidities tool enabled them to adjust these treatments appropriately to provide a tailored management plan. The medical students most appreciated clear directive content displayed in a user-friendly manner.

## Background

One in four adults in the UK have two or more medical conditions.<sup>1</sup> One in three adults admitted to hospital in the UK have five or more conditions.<sup>1</sup> The proportion of adults with multiple health conditions (or multimorbidity) is rising rapidly: ten years ago, one in ten patients admitted to hospital as an emergency had five or more conditions.

**“ People with multimorbidity have poorer functional status, quality of life, health outcomes, and are higher users of ambulatory and inpatient care than those without multimorbidity. ”**

They also have a higher mortality rate. The population in the UK and throughout the world is currently ageing, and older people have higher rates of multimorbidity.

However, multimorbidity is not confined to older people. Thirty percent of people with four or more conditions are under 65 years.<sup>1</sup> Being poor is another risk factor for having multiple illnesses: and poor people tend to develop multimorbidity earlier in life.<sup>2</sup> This all poses a problem for patients, healthcare professionals, and health systems. 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.

**“ The entire healthcare system needs to change so that it can provide a better service for patients with multimorbidity. The system of healthcare professional education needs to change also. ”**

According to Whitty et al., “training from medical school onwards, clinical teams, and clinical guidelines, however, all tend to be organised along single disease or single organ lines.”<sup>3</sup> Similarly, Barnett et al. state that “existing approaches focusing on patients with only one disease dominate most medical education”.<sup>4</sup> There is evidence that medical

students feel unprepared for clinical practice generally and for the management of patients with comorbidities specifically. The report “How Prepared are UK Medical Graduates for Practice?” was commissioned by the General Medical Council: it showed that foundation year 1 doctors “felt unprepared for complex cases (e.g. confused patients, comorbidity), often feeling uncertain. Some participants reported being better prepared for making diagnoses than patient management.”<sup>5</sup> Participants in this study “talked a lot about the growing issue of clinical complexity in terms of comorbidity and the need for foundation year 1 doctors to avoid thinking in silos.”<sup>5</sup> So there is a real need to improve undergraduate education in this area.

Clinical decision support is “any electronic system designed to aid directly in clinical decision making, in which characteristics of individual patients are used to generate patient-specific assessments or recommendations that are then presented to clinicians for consideration”.<sup>6</sup> Clinical decision support has a clear role in the management of patients with multimorbidity. But until now clinical decision support tools have offered no support when dealing with patients with comorbidities. They cover single conditions only.

In light of this, BMJ recently launched a new tool – BMJ Best Practice Comorbidities. This tool enables students and doctors to add a patient's comorbidities to an existing management plan and get a tailored plan instantly. It supports students in treating the whole patient when managing acute conditions.

We have developed this new tool with users and have recently launched it as a pilot. However, we want to ensure that the tool is fit for purpose and can help clinical medical students better manage patients with multiple conditions. This paper describes how we have evaluated the tool with this important audience.

## What we did

Simulation-based education has been shown to improve the knowledge, skills and performance of healthcare professionals in an environment that is safe for learners and patients. Simulation can also be used in “testing of the usability, suitability and safety” of medical resources.<sup>7</sup> Similarly preclinical testing of medical resources within a simulated environment “offers the opportunity to avoid costly mistakes or poor designs from progressing further downstream in the development cycle.”<sup>7</sup>

To ensure the usability, usefulness and effectiveness of BMJ Best Practice Comorbidities in guiding medical students in the diagnosis and management of patients with multiple complex conditions, we conducted a series of simulations with medical students. We invited final and penultimate year medical students to test the resources under controlled conditions.

We created simulation scenarios of patients with multiple conditions and then asked the students to work through the scenarios and use BMJ Best Practice Comorbidities to develop a holistic management plan.

One of the simulations was based on a patient with COPD and type 2 diabetes. A second simulation was based on a patient with ST elevation myocardial infarction and chronic kidney disease. Both scenarios were chosen as these conditions were among the most common and important topics on BMJ Best Practice. The students were provided with a laptop that was open on their desk and that was logged into BMJ Best Practice. At the end of the simulation, students were asked about the usefulness, usability and effectiveness of the tool.

## Results

Twelve medical students took part in the simulations. Eleven students were female, and one was male. Four students were in their final year and eight were in their penultimate year. Each student took part in two simulated scenarios – each scenario lasted 20 minutes. Detailed field notes were taken during the simulations and the interviews. Notes were analysed to allow concepts and themes to emerge from the data.

**Six key themes emerged from analysis of the notes.**

## Theme one: changing practice

BMJ Best Practice enabled the medical students to come up with correct patient management plans for the case scenarios in question. The BMJ Best Practice Comorbidities tool enabled the students to adjust their plans appropriately in light of the comorbidities that emerged during the simulated scenarios. Many students commented that the comorbidity content jogged their memory and reminded them of important things that they would need to put into practice. The students found the content to be helpful and useful. Many commented that they do not have anything else like this.

## Theme two: changing practice

There were a number of features of BMJ Best Practice Comorbidities that the students found particularly useful. Many liked the flow diagrams and bullet points and wanted more of these. The students were positive about directive content that suggested a clear course of action – for example “never stop insulin in a patient with type 1 diabetes”. They liked step by step guidance and finding out what order they should do things – that is, first line or second line.

## Theme three: the broader experience of using clinical decision support at the point of care

The core purpose of the evaluation was to seek feedback from medical students on the BMJ Best Practice Comorbidities tool. However many students were keen to discuss wider aspects of using BMJ Best Practice. The medical students gave positive feedback about the following components of BMJ Best Practice: the treatment algorithms, the differential diagnosis tables, the investigations section, and the case histories. They tended to use the resource on their mobile and on the app. The students were positive about the overarching display of content on BMJ Best Practice – including the tabs that show the diagnosis and management sections. All the students used the search functionality – but some of them struggled to find the exact content that they needed. Once they did find the relevant topic, they tended to go straight to the treatment algorithm.

## Theme four: suggestions for improvement

Many of the students made suggestions on how the content and its display could be improved. There was a preference for small chunks of content in short paragraphs that would be easier to read quickly. They wanted to be taken directly to the comorbidity content (without having to scroll down) and wanted it to be explicitly clear how the comorbidity content had changed things. They also wanted the layout to be easier to read – with better use of headings and sections in bold typeface so that the important content would stand out more. All the students worked through two scenarios and all were faster at using the tool the second time they used it – they knew what to expect.



### Conclusions

BMJ Best Practice enabled the medical students to come up with correct patient management plans for the case scenarios, and the Comorbidities tool enabled them to adjust their plans appropriately. The medical students most appreciated clear directive content displayed in a user-friendly manner and made detailed suggestions on how the content could be further improved.

There are limitations to this evaluation. It focussed on a single clinical decision support tool and so is likely to be applicable only to this tool. Some of the students had used BMJ Best Practice before and some had not – the students who had used the resource before may have been more ready and able to use an addition to the tool – such as BMJ Best Practice Comorbidities. This was a simple low-technology simulation: this makes it easier to set up but also more difficult to draw definite conclusions about the transferability of the findings to clinical practice. However medical students do not yet diagnose and manage real patients – and simulation is a recognised method of assessing the performance of healthcare professionals.<sup>8</sup> Lastly even though this was a relatively small evaluation, the feedback from students on the tool was consistent throughout.

This is the first time we have used simulation in the evaluation of this resource. We plan to review and continually improve how we conduct simulations of this kind and use the results of our evaluations in future projects – for example in evaluating the use of the resource by foundation programme doctors. We also plan to use the results to continue to improve BMJ Best Practice Comorbidities. The ultimate goal is to create a tool that will help overcome an enormous challenge to all healthcare systems: how best to provide holistic care to the one in four adults with comorbidities.

## Further information

To find out how BMJ Best Practice Comorbidities can support your needs in clinical decision needs, please contact:

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