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BRIEF COMMUNICATION

Online Educational Tools to Improve the Knowledge of Primary Care Professionals in Infectious Diseases

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ABSTRACT

Background Infectious diseases kill more than 10 million people worldwide every year. It is therefore vital that doctors receive a good education in this field. Online learning is one way in which doctors can learn new knowledge and skills. We conducted this study to determine whether the infectious diseases interactive online learning packages enabled primary care professionals to increase their knowledge and skills in the area of infectious diseases.

Description We built a series of interactive case histories on the following topics: tuberculosis; hepatitis B; hepatitis C; influenza; meningitis; mumps; helicobacter pylori; chlamydia; and genital herpes. The modules involved a pre-test, a number of interactive cases and/or a summary of up-to-date knowledge in that area and a post-test.

Results The learning modules were completed by 3,956 users. Wilcoxon's test showed that learners increased their knowledge to a statistically significant degree ($p < 0.001$) and qualitative data showed that users found the tool useful.

Discussion The results appear to demonstrate that online modules are effective in helping health professionals learn more about infectious diseases.

Background

Infectious diseases kill more than 10 million people worldwide every year. (http://www.who.int/whr/en/) The top killers include HIV infection, diarrhoea, tuberculosis, meningitis and hepatitis. Many of these diseases particularly affect people in the developing world but with the increasing ease of worldwide travel, clinicians in all countries need to learn about them. Online learning is one way in which clinicians can learn new knowledge in today's changing healthcare environment. It offers a number of advantages over face-to-face learning; for example, it can be done at a time and place that suits the learner. But there is as yet limited evidence on the effectiveness of online learning (Sandars & Walsh, 2004). Clinicians that use our online learning website, BMJ Learning, have consistently requested online learning modules in infectious diseases. We conducted this study to find out if online learning packages in infectious diseases enabled primary care professionals to increase their knowledge. We also looked at the acceptability of these types of packages to users.

Description

In 2003, the BMJ Group launched BMJ Learning (www.bmjlearning.com), an evidence based online learning resource for healthcare professionals (Briffa & Abbasi, 2003). In response to users' requests, we built a series of comprehensive interactive case histories on infectious diseases. We built the case histories on infectious disease topics that were requested by users.

These consisted of:

- An initial pre-test to assess users' current knowledge;
- A series of comprehensive interactive case presentations; At each stage of the cases users were asked how they would manage the patient;
- A final post-test, a repeat of the pre-test to find out what users learned from the module.

Typically users complete the modules in one hour so the time between the pre and post test is about one hour. We built a series of interactive case histories on the following topics: tuberculosis; hepatitis B; hepatitis C; influenza; meningitis; mumps; helicobacter pylori; chlamydia; and genital herpes.

We also designed online tools to assess primary care health professionals' baseline knowledge of these problems. The tools were in the form of "best of many" multiple choice questions. We then built online, interactive, educational tools to increase health professionals' knowledge and skills on how best to care for patients with these problems. The first page was an outline of the learning outcomes. The users then learned about the topic in an interactive way. We supported the text with graphics and illustrations. At the end of the module, we reinforced the keypoints related to the modules. We included a comprehensive list of references and further resources. Finally, we encouraged the users to reflect on the learning experience by writing their thoughts on what they had learned. Learners were able to print out a certificate of completion stating that they had passed this learning module.

We have a robust editorial process and these modules went through this process. Experts were commissioned to write the modules and we used our user group to ensure that the modules were presented at the appropriate level for primary care. All the modules were peer-reviewed.

Evaluation

We measured learners' baseline knowledge and knowledge upon completion of the learning modules. Wilcoxon's test was used to see if the learners increased their knowledge to a statistically significant degree. Qualitative feedback was used to find out if learners found the modules acceptable.

Results

Quantitative data: The learning modules were completed by 3,956 primary care professionals. Eighty-six percent of these were GPs and 14% were practice nurses. Wilcoxon's test showed that learners increased their knowledge to a statistically significant degree ($p < 0.001$) – see Table 1.

Table 1: Change in knowledge after learning

	No. of users	Mean pre-test score	Mean post-test score	Mean improvement in score	p–value
Tuberculosis	106	47	91	+ 44	< 0.001
Hepatitis B	72	58	89	+ 31	< 0.001
Hepatitis C	174	57	94	+ 37	< 0.001
Influenza	147	62	80	+ 18	< 0.001
Meningitis	401	66	80	+ 14	< 0.001
Mumps	682	58	85	+ 27	< 0.001
Helicobacter pylori	166	49	82	+ 33	< 0.001
Chlamydia	1548	54	82	+ 28	< 0.001
Genital herpes	300	69	83	+ 14	< 0.001

Qualitative data: On completion of the online learning resource, learners are asked to give us feedback. This is then published on the site. All the feedback is collated electronically. There were 1,251 responses with feedback on the modules. Feedback was overwhelmingly positive with many users saying that they had learned a lot and that they planned to change their practice as a result of the learning. Some users mentioned that their local institution did not allow them to work to the evidence base or guidelines in the modules: for example some said that their local institution did not allow them to prescribe certain drugs even though international guidelines reflected in the modules recommended them. A few users said that the modules were not challenging enough. Not all participants provided feedback and therefore we cannot know what users who did not give feedback thought of the tool. It is difficult to tell what lack of feedback means in this setting. It could mean that users were so unsatisfied with the tool that they did not give feedback or that they saw other users' positive feedback and were satisfied with the content and felt that they had nothing further to add.

Discussion

Overall, the results appear to demonstrate that online modules are effective in helping primary care health professionals learn about infectious diseases. An ideal educational intervention results in learners changing their practice for the better as a result of the intervention. Many users said that they would alter their practice as a result of the learning but a limitation of our study is that we

have no evidence that learners actually did change their practice. Further research is needed to see if clinicians do in fact change practices or behaviors as a result of new knowledge from online instruction.

Conclusion

Online modules appear to be effective in helping primary care health professionals learn about infectious diseases.

Note: In some modules, users increased their score by a small amount (14) and in others they increased their score by a large amount (44). This is likely to reflect the degree of baseline knowledge that users had about a particular condition.

References

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WORLD HEALTH ORGANIZATION website: http://www.who.int/whr/en/

