Objectives

Optimal antimicrobial stewardship (AMS) requires adequate technical knowledge of subjects including pharmacology, microbiology and infection prevention, and improved knowledge of antimicrobial resistance was highlighted as a strategic aim in the recent United Kingdom (UK) Antimicrobial Resistance Strategy. Undergraduate students appear interested in receiving increased antimicrobial education, but there is limited evidence on their views about AMS. Recognising the multidisciplinary use of antimicrobials, we explored the educational content delivered in undergraduate health and veterinary sciences in the UK.

Methods

All UK higher education institutions with medicine, nursing, pharmacy, dentistry or veterinary undergraduate courses were identified from the Universities and Colleges Admission Service (UCAS) list. Module leaders and/or course organizers were invited to participate in an anonymous, web-based electronic survey exploring the AMS content in their curricula. Elements of optimal AMS are described in Box 1. Responses were analysed using descriptive statistics.

Results

112/136 (82%) UK universities responded. AMS was explicitly incorporated in most curricula (88/112, 79%, no data for 3 universities), with some variation amongst disciplines (dentistry 100%; medicine 96%; veterinary 96%; pharmacy 87%; nursing 63%). Of 88 universities reporting AMS in their curricula, 63 (72%) provided the number of hours, reflecting variation as well (medicine 41.8 ± 67.6; veterinary 37.6 ± 49; pharmacy 21.2 ± 28; nursing 19.8 ± 42.1; dentistry 8.4 ± 4.8, Kruskal-Wallis H= 9.134, 4 d.f., P=0.0578). All AMS elements were discussed in 36% (32/88) universities, ranging from 67% (medicine) to 13% (nursing). Maintaining infection control precautions was most frequently taught (94%, 83/88), followed by minimisation of unnecessary antimicrobial prescribing (72/88, 82%); on the other hand, therapeutic drug monitoring and IV-to-oral switch were reported in ~50% of courses.

Conclusion

Whilst AMS is explicitly incorporated in most UK health and veterinary undergraduate courses, educators may avoid the fragmentation suggested in our study by considering AMS as a bundle of optimal antimicrobial prescribing practices. The variability in hours and content delivered in UK universities merits further exploration. Continued education initiatives for graduates may need to strengthen the aspects such as "IV-to-oral" switch less frequently discussed in undergraduate education.

Box 1. Elements of antimicrobial stewardship (AMS)

1) Minimising unnecessary prescribing
2) Appropriate antimicrobial administration timing
3) Therapeutic drug monitoring
4) Adequate infection control
5) Appropriate specimens for microscopy, culture and sensitivity
6) Intravenous (IV) use only in severely ill patients or where oral treatment would not guarantee penetration
7) Daily review of results and prompt de-escalation to narrow-spectrum agents
8) Daily review and prompt switch of IV route
9) Single dose surgical prophylaxis as appropriate.