Article

Inclusion of public health in the Pharm curriculum in the United Kingdom: Content analysis

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Abstract: 1) Public health remains a tiny portion of the undergraduate pharmacy curriculum and the material is integrated into other modules. The objective of this study is to describe the UK undergraduate pharmacy curriculum, including its public health content; 2) Methods: A qualitative method (content analysis of websites) was used to describe the UK undergraduate pharmacy curriculum and teaching and learning policy. This involved selecting relevant concepts and then quantifying their presence and the relationships between them. The NVivo software was used to carry out 'group queries' and visualisation of results; 3) Results: Public health remains an optional module in the curricula of many UK schools of pharmacy. Several public health-related topics are often integrated into other modules, but UK undergraduate pharmacy curricula are still dominated by traditional pharmacy modules; and 4) Conclusions: Most of the curricula analysed were dominated by traditional pharmacy modules designed to enhance students' knowledge and skills. The skill set of UK pharmacy students with respect to macro-level public health activities needs to be improved in order to enhance pharmacists' contribution to public health.

Keywords: Patient care, pharmacists, pharmacy curriculum, pharmacy education, public health, qualitative method

1. Introduction

The role of pharmacists in public health is widely documented [1-4].

According to the UK's Faculty of Public Health (FPH), public health is defined as:

"The science and art of promoting and protecting health and well-being, preventing ill health and prolonging life through the organised efforts of society" [5].

This definition is relevant as public health is seen as population-based; is focused on a collective responsibility for health, its protection and disease prevention; recognises the important role of the state, as well as socio-economic and wider determinants of health. There is also an emphasis on partnerships amongst those whose actions contribute to the health of the population [5].

Interestingly, the General Pharmaceutical Council's (GPhC) standards for the initial education and training of pharmacists require UK schools of pharmacy to teach students about public health [6]. Nevertheless, public health remains a tiny portion of the undergraduate pharmacy curriculum and the material is integrated into other modules covering topics such as sociology (social and behavioural science and drug misuse), health psychology (health promotion and disease prevention), and epidemiology (aetiology and epidemiology of major diseases) [6]. This is in

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contrast to other clinical or science-based topics which are often taught as standalone modules or courses [6].

In the USA it has been acknowledged that public health is relevant to pharmacy education. In 2013 the Centre for Advancement of Pharmacy Education (CAPE) stated that pharmacy graduates must demonstrate that they have acquired knowledge of public health theories and models and are capable of applying them [7]. The American Association of Colleges of Pharmacy (AACP) Public Health Special Interest Group (SIG)-CAPE working group has also collectively identified the CAPE 2013 outcomes as important indices of coverage of public health within pharmacy curricula [7]. In addition the Accreditation Council for Pharmacy Education (ACPE) requires interprofessional interaction and blended environments, both of which are advanced within the public health curriculum [8]. A US study [9] suggested that although the pharmacy profession has evolved from product-orientated to patient-centred care, with pharmacists contributing to micro-level public health activities (e.g., disease management, health and wellness screening, immunisations, medication therapy management), there remain unmet needs for pharmacists in macro-level public health functions (i.e., assessment, policy development, and assurance at the population-based level). Changes to the education and practice of pharmacy that will require pharmacy degrees to equip graduates with the necessary knowledge, skills, attitudes and values to contribute to public health at the micro and macro levels, regardless of the setting of their practice [10] have therefore been proposed [11]. In addition, pharmacists will be expected to evaluate public health the costs and effectiveness of public health policies and to collaborate with government agencies to develop public health policy [12].

Unfortunately the GPhC's recent observation that the Master of Pharmacy (Pharm) degrees currently offered by British universities fail to prepare pharmacists to deliver the care and services expected of them in the future remains a barrier to this aspiration [13]. According to the GPhC pharmacists must be capable of delivering patient-centred care, have good people skills and be able to work in a multi-disciplinary team [13].

Pharm programmes in the UK are updated every six years following GPhC accreditation [14]. This study examined what students are currently taught and considered whether the UK undergraduate pharmacy degree reflects the global direction of travel of the pharmacy profession, particularly with respect to public health provision. Also, as time constraints mean there might be a tension between science- and public health-oriented modules in UK undergraduate pharmacy curricula, the study examined whether UK Pharm programmes are fit for purpose (whilst recognising that they have been accredited by the GPhC).

Objectives - To describe the UK undergraduate pharmacy curriculum, in particular its public health content.

2. Materials and Methods

A qualitative method (content analysis of websites) was used to describe the UK undergraduate pharmacy curriculum and teaching and learning policy. Content analysis has been described as a method of analysing written, verbal or visual communication messages [15] and as a research method; it is a systematic and objective means of describing and quantifying phenomena [16,17]. Content analysis involves choosing concepts to examine and then quantifying them and exploring the relationships between them [18].

The advantages of content analysis include the fact that it is a content-sensitive method16 that offers some flexibility in terms of research design [19]. Content analysis can be used with both qualitative and quantitative data and can be inductive or deductive [20]. There are no systematic rules for analysing data; but both methods involve three main phases: preparation, organisation and reporting. The main characteristic of content analysis is that the words of the text being analysed are grouped into much smaller content categories [21,22]. Copies of the UK pharmacy schools' curricula were obtained from the various schools' websites, where possible, or by email from pharmacy

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school administrators. In most cases the curriculum included lists of classes, objectives and competencies. These documents were uploaded to the qualitative data analysis software NVivo® (version 10). The analysis required the analyst to immerse himself in the data (the curricula) by reading them thoroughly several times in order to allow new insights and theories to emerge [23]. An open coding process was used; categories were created as well as abstractions of categories. 20 In NVivo, open coding involves using NVivo memos and annotations to make notes whilst reading the data [20]. The written data were re-read and during the process the analyst wrote down as many headings to describe all aspects of the content [22,24,25] as needed in the form of NVivo memos and annotations. NVivo allows the analyst to generate categories freely at this stage in the analytical process [24].

When the open coding was complete the categories were then grouped under higher-order headings [24,26]. The number of categories was reduced by collapsing similar categories into broader higher order categories [24,27]. With NVivo, it is possible to present some numerical [28] and visual representations in the analysis, as well as perform group queries, that is finding items that were associated with other items in the project and presenting the output in the form of lists (groups) [29] At the time the study was conducted (May 2014 - March 2015), there were twenty-nine schools of pharmacy in the UK, according to the GPhC website [30]. CA used input from JO and JP to validate the content analysis process [29].

3. Results

Characteristics of UK schools of pharmacy

All the UK schools of pharmacy (anonymised with letters A to Z) were included in the study, except that of the University of Lincoln – which was newly established at the time of analysis. Twelve of the 28 schools (all in England) included in the study (42.8%) were set up after 2000. The geographical distribution of the schools analysed was as follows, two were located in Northern Ireland, one in Wales, two in Scotland, and twenty-three in England.

The Subjects Included in UK MPharm curricula

The curricula of all schools of pharmacy were subjected to content analysis to determine what elements were related to public health. The NVivo software was used to carry out 'group queries' and visualisation of results. The analysis revealed that the UK undergraduate pharmacy curricula were dominated by basic science, clinical studies and modules on skills development (such as production/formulation and dispensing activities), research and law and ethics. In most cases coverage of public health topics was minimal, and in some cases confined to optional modules. The core scientific subjects taught included pharmacology, biochemistry, anatomy, physiology, pharmaceutics, pharmaceutical technology, pharmaceutical chemistry, microbiology, drug discovery and formulation, pharmacognosy and medicinal chemistry. These subjects were often grouped together, under different names and headings. Coverage of topics such as management and business studies was minimal and in some cases confined to optional modules.

Public Health

Qroup query' revealed variation in the public health content of the curricula of UK pharmacy schools. A representation of the data suggests that the curricula of pharmacy schools such as University A, B and C seemed to have more public health-related topics than those of other UK

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pharmacy schools. Coverage of public health appeared to emphasise safety, risk factors, disease prevention, adherence and addiction.

Next NVivo was used to visualise the pattern of coding for individual schools of pharmacy. In general the most frequently used words were 'clinical', 'science', 'dispensing', 'production' and then 'research'. The exceptions to this pattern included, for example, the Schools of Pharmacy at D, E , F and G universities, where 'experiential', 'public health issues', 'professionalism' and 'skills' respectively were the most frequently used words. Both the word frequency search and the visual representation of coding suggested that 'public health' was a relatively low priority for most UK pharmacy schools.

Further investigation of some of the specific public health-related issues covered by UK pharmacy schools revealed that only some Schools of Pharmacy namely, H, I, G, J, K, A and K Universities (all in England) mentioned the word 'safety' in their curriculum in any form ('public health safety'; 'patient safety'; 'health and safety' etc.). This was confirmed by a text search of the UK pharmacy schools' curricula. The content analysis also provided some evidence that the curricular of older schools of pharmacy and those established in England between 1900 and 1949 contained more references to 'safety' than other schools.

The C University, School of Pharmacy curriculum illustrates how 'public health safety' was covered. The topic is addressed in Year 4 in the 'Clinical Pharmaceutics' module, one of the aims of which is to teach students to "Appreciate safety, efficacy and quality of medicines for children".

In the K University, School of Pharmacy curriculum the 'Pharmaceutical Care' module for Year 4 students is described as:

"An integrated unit covering evidence-based practice, health economics, prescribing, patient safety and pharmaceutical care…. develop[ing] students' core knowledge and problem-solving skills relating to patient safety, prescribing and pharmaceutical care."

'Risk factors' were mentioned in the curricula of five Schools of Pharmacy: J, C, L, E and A. The J University School of Pharmacy curriculum for the Year 4 module 'Travel Health' (optional) was described as follows:

"The aims of this module are to give the student advanced understanding of theoretical and practical knowledge in all elements of travel health. The module will cover the role of the pharmacist in travel health promotion and prevention of illness...The course content will include risks of travel in different countries..."

The A University, School of Pharmacy Year 1 Pharmacy Practice Syllabus Outline mentions, amongst other topics, 'factors affecting the treatment process'.

The same School of Pharmacy Year 2 module on 'Public Health (Promoting Public Health)' teaches students about

"adverse drug reactions (ADRs) – their prevention, detection and management; the role of the pharmacist in minimising risk associated with drug therapy"

and also covers

"Epidemiology of disease and determinants of public health, including lifestyle, employment status, air quality, crime, housing; health education and promotion roles for pharmacists in areas such as: child health, smoking cessation, exercise, diet and obesity, contraception and sexual health, alcohol

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consumption, vaccination, patients with long-term conditions, services for drug misuse and encouraging self-care."

It seems that the teaching of preventative care varies between schools. For example, in the Year 1 programme of the School of Pharmacy, M University , there were statements such as,

"… you look at infection and immunity … [and in the final year] your studies will deal with treatment of infectious diseases, pharmaceutical public health and clinical pharmacy".

The curriculum for N University School of Pharmacy states that during the Level 2 pharmacy programme:

"[Students] will learn how medicines are preserved and the process that cause premature breakdown of medicinal products … and how we are involved in protecting the public from the potential harm associated with the use of medicines."

When it comes to the teaching of illness prevention the other UK schools of pharmacy seemed to adopt different methods. For example, L UniversitySchool of Pharmacy offered a 'Pharmacy Practice' module whilst 'O' University School of Pharmacy stated that it teaches students about 'Promoting Healthy Lifestyle'. Final year pharmacy students at P University are taught about public health and health promotion as part of a module designed to ensure that they

"Appreciate the causes and systems of cardiovascular diseases ... [as well as] … patient counselling and lifestyle advice."

The content analysis also provided some evidence that UK pharmacy schools provide undergraduates with some training on issues surrounding 'adherence' and 'addiction'.

Q University School of Pharmacy covered adherence in a Year 3 module entitled 'Optimisation of Pharmaceutical Care'. The 'Pharmacy Practice' module in Year 2 helps C University School of Pharmacy students to "distinguish the concepts of compliance, adherence and concordance". During Year 3 training, C University School of Pharmacy students learn more about adherence and by the end of the year they are expected to be able to "undertake a basic medication review". The A University School of Pharmacy covers adherence at an early stage, in a Year 1 module entitled 'Pharmacy Practice'. Some of the topics covered in the module were:

"Factors affecting the treatment process. The function of medicines and the rational use of medicines. Sociological and behavioural aspects of the use of medicines. Medicines adherence. The placebo effect."

In contrast the Year 4 module at C University School of Pharmacy entitled 'Health Care, Drug Use and Pharmacy in Developing Countries' focuses on global poverty:

"The World Health Organisation believes that pharmacists could make a greater contribution to health care in developing countries. This module will provide an overview of health care, disease patterns, the use of medicines in low-income countries..."

Interestingly, the information about this module also highlighted the fact that:

"Examination of these issues requires an interdisciplinary approach drawing on material and research from a range of perspectives..."

Finally there is little emphasis of 'emergency preparedness' in the curricula of UK pharmacy schools; the content analysis identified the words 'emergency' and 'emergencies' in the curricula of only

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three schools of pharmacy, those at the J, A and C Universities. One of the topics taught in the A University School of Pharmacy Year 3 module entitled 'Pharmaceutical Care', was "Dealing with medical emergencies and the provision of first aid." In the C University School of Pharmacy curriculum the word 'emergency' occurred in reference to hormonal replacement, which was covered in a pharmacology module entitled 'Endocrinology and Associated Diseases'. The content analysis was also used to determine the extent to which these macro-level public health activities (e.g. surveillance, pharmacovigilance, evaluation, epidemiology, assessment, etc.) were represented in the curricula of UK pharmacy schools.

The word 'assessment', found in the curricula of some schools of pharmacy, for example, at H, O, R, N and S Universities, referred to assessment of students rather than public health or health needs assessment. The exception was the curriculum of B University School of Pharmacy where the Year 4 module entitled 'Public Health for Pharmacists' was described as covering

"Healthcare policy relating to pharmacy; health surveillance; health-related data; health needs assessment; epidemiology; pharmacovigilance; application of evidence-based practice; health technology assessment; systematic review; pharmaceutical service development; service specification and implementation; pharmacoeconomics; business case; audit; evaluation; governance."

References to 'policy' were often not related to public health policy development, but to pharmacy practice. This was the case at T University School of Pharmacy where the word 'policy' occurred in the description of a module on 'Integrated Patient Care':

"The course will cover developments in pharmacy legislation taught in previous years and other legislation and policy relevant to the practising pharmacist."

Although the content analysis identified that public health and health policy were covered in the curricula of some schools of pharmacy such as those at, E, A and B Universities, in no case did the curriculum appear to deal with pharmacists contributing to development of public health policy. When the word 'assurance' appeared in the curricula of UK pharmacy schools (e.g. at R, C, Q and K Universities), it was in reference to quality assurance of pharmaceutical products rather than to public health assurance:

"K11 - an appreciation of the principles of quality and quality assurance mechanisms in appropriate aspects of scientific and professional activities." [R University School of Pharmacy: Part 2 course details for CH143 and CH344]

"Design, Formulation and Quality Assurance of Medicinal Products" [Year 3 – Q University School of Pharmacy].

4. Discussion

This paper looked at what pharmacy students are currently taught, in order to determine whether UK undergraduate pharmacy degrees reflect the global direction of travel of the pharmacy profession, particularly as it relates to public health provision. Poor adherence could be associated with poor monitoring and reporting of serious adverse drug events (ADEs) by pharmacists [31] but the magnitude of the problem also varies with the condition being treated [32]. The word 'adherence' did not feature widely in the curricula of UK schools of pharmacy, appearing only in the curricula of undergraduate pharmacy degrees at A and C Universities (Year 2). A closely associated word, 'optimisation', appeared only in the curricula of Q and C Universities (Year 3). Although these topics are not necessarily macro-level public health activities; it seems that many of the issues relating to

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treatment adherence or optimisation of medication are dealt with during postgraduate pharmacy education, such as continuous professional development (CPD) programmes or taught in diploma and masters' programmes.

This content analysis of the curricula of UK pharmacy schools also revealed that they were dominated by science-oriented subjects rather than focusing on public health. Overseas programmes based on UK programmes seem to share the same broad approach with, for example over 90% of the BPharm courses emphasizing pharmaceutical chemistry, basic biomedical sciences (physiology, pharmacology, pathology, biochemistry, and microbiology), and pharmaceutical technology [33] Yet in many UK pharmacy schools, public health is often taught as an optional module or integrated with other topics. There are professional advantages to pharmacists as well as benefits to patients of making public health a core module in the curricula of UK schools of pharmacy as this would broaden and extend pharmacists knowledge and skills in this area.

A number of studies have confirmed that community pharmacists play an important role in smoking cessation programmes [34-36], so it was surprising that an NVivo text search revealed that the word, 'smoking' appeared in the curricula of only three UK schools of pharmacy: E, A and C Universities (Year 4). Related words 'smoke' and 'smoker' were not found in the curricula although 'tobacco' was mentioned in the C University School of Pharmacy curriculum (Year 4). This does not necessarily indicate that other UK schools of pharmacy are not teaching undergraduates about smoking cessation, but it may indicate the priority they accord this very important public health topic.

A number of studies have also identified a need for healthcare practitioners to improve their communication techniques [37-40]. There was no evidence to suggest that UK schools of pharmacy were teaching advanced communication methods to students but there was some evidence that many of them were developing students' skills in communication through written assignments and oral presentations on public health, etc.

It has also been noted that interdisciplinary public health initiatives can enhance pharmacists' skills for dealing with public health issues [41], but the content analysis provided little evidence that UK undergraduate pharmacy training includes promotion of interdisciplinary initiatives. The exception was the School of Pharmacy, E University, where the curriculum indicated that nutritionists taught the nutrition element of the public health module. It is to be hoped that the programme at the School of Pharmacy, University of Birmingham will inspire other UK pharmacy schools to develop interdisciplinary initiatives, particularly as this programme reflects the Birmingham School's commitment to integrated medical training and education [42].

The risks associated with polypharmacy and the potential for inappropriate therapy need to be considered and balanced against the possible benefits of multiple drug therapies [43]. The Scottish government has identified a need for pharmacists' to contribute more to management and monitoring of polypharmacy to minimise the risks to patients [44].

According to the Department of Health, Britain has a relatively large population of problem drug users and increasing levels of harm from alcohol consumption [45]. A number of studies have noted that pharmacists are involved in treatment of drug addiction and substance abuse [46-48], however the content analysis provided little evidence that pharmacy students were being taught about pharmacists' role in anti-doping activities [48]. In Europe alcohol is not only the third biggest risk factor for non-communicable diseases (NCDs), ill health and premature death [49], it is also known to directly or indirectly induce over 60 different types of illness [50], as well as being associated with several other risk factors [51,52]. The content analysis provided some indications that alcohol misuse was one of the public health topics often discussed with students, but UK schools of pharmacy also need to extend their coverage of motivational tools such as the transtheoretical model of change

(TTM) [53,54], Ajzen's theory of planned behavior [55] and goal-setting theory [56] and their relevance to various lifestyles and addictive behaviours. To address some contemporary public health challenges the pharmacy profession might also need to promote the establishment of healthy living pharmacies (HLPs) [57]. Three UK schools of pharmacy (E, A and C Universities) indicated that they were teaching about HLPs, but the others did not appear to provide any information about HLPs in undergraduate courses.

This study revealed that in the UK pharmacy degrees the emphasis is on basic sciences, many of which are hardly used in routine community pharmacy practice, rather than on public health topics – which in some schools were covered in optional modules or integrated with other pharmacy topics. Often coverage of public health topics focused on micro-level public health activities instead of macro-level public health topics requiring the involvement of public health specialists. This does not seem consistent with the global direction of travel of the pharmacy profession [10,12], and it raises questions about whether UK Pharm programmes are still fit for purpose with regard to equipping pharmacists to play a role in public health [13]. UK schools of pharmacy and the pharmacy profession need to work more closely with other healthcare professions and with public health organisations, such as Public Health England, the Faculty of Public Health, etc. to enhance the role that UK community pharmacists play in public health.

The reliability of the content analysis in this study has been enhanced by linking the results closely to the data, using illustrative excerpts and describing the context of findings, selection and characteristics of the participants clearly, as well as the data collection and analysis techniques. The analysis involved comparing codes within and between curricula, noting patterns and discrepancies and drawing conceptual maps to examine relationships between themes [23,58]. The limitations of the study include the heavy reliance on information available from the websites of schools of pharmacy. The published curricula may not necessarily represent the teaching of pharmacy in UK accurately and may have been incomplete or out-of-date at the time this analysis was undertaken. We cannot, therefore, rule out the possibility of bias. The sheer quantity of data was daunting [20]. The limitations of NVivo content analysis include that NVivo is a complex package that can take time to learn; relying on software can distance researcher from the data; the researcher can get caught in a 'coding trap'; the software can identify references to phrases but cannot discern contextual differences and use of software cannot compensate for poor data or weak interpretive skills [59]. The fact that a few UK pharmacy schools (five) published a summary of their curriculum on their website slightly reduced the robustness of the content analysis process. However, some of the schools did provide a more detailed curriculum when approached for assistance although two schools were unwilling to do so. These facts notwithstanding, as school of pharmacy websites are often the first point of enquiry for prospective students, parents, etc., it seems reasonable to expect them to provide detailed and accurate information about the content of undergraduate programmes.

5. Conclusions

This content analysis of the curricula of UK schools of pharmacy identified that the number of UK schools of pharmacy has almost doubled since the year 2000. There was however, no indication that this sharp increase in the number of pharmacy schools has had much impact on the teaching of public health to students, particularly as public health remains an optional module in many UK schools of pharmacy. In many UK pharmacy schools teaching on public health is integrated into other modules. Most of the curricula analysed were dominated by traditional pharmacy modules designed to enhance students' knowledge and skills in the sciences, dispensing, production, research, law and ethics, and clinical pharmacy. In terms of the public health content of UK undergraduate pharmacy programmes, anecdotal evidence tends to indicate that not much has changed with the curricula since this study was conducted. It seems there is a need to develop UK pharmacy students' skills for dealing with macro-level public health activities. Enhancing coverage of macro-level public health activities would make UK Pharm programmes fit for purpose,

particularly with respect to provision of community pharmacy services and public health services. This is becoming more important as UK pharmacy schools are seeking to boost the profile of the pharmacist with the public and commissioners, drawing special attention to the contribution the profession can make to cost-effective healthcare [60]. This ambition to enhance the profile of the pharmacist is in line with the priorities spelt out in the 'Pharmacy schools council strategic plan 2017–2021'[61].

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