

The UK pharmacy degree: Attrition rates and demographics of non-completers

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Abstract

Introduction: While it is known that a significant proportion of students within the higher education system do not graduate as expected, knowledge about student attrition in pharmacy is limited. A greater understanding of attrition rates will allow workforce planners and policy makers to estimate the number of new pharmacists that can be expected to join the register each year.

Aim: This paper aims to provide information on attrition among pharmacy students in the UK.

Method: Data are collated from a range of sources to explore trends or patterns in attrition according to factors such as gender, institution and student type.

Results: Between the years 1994 and 2000 overall attrition reached a peak (19%) in 1997, although time series analysis found no significant trend ($p = 0.612$). Attrition rates vary by institution, overseas compared with home students and male students compared with females are at greater risk of dropping out.

Conclusion: Changes to the way in which student data are collected are recommended, as it is currently difficult to track a cohort with absolute certainty. Nevertheless, the paper draws attention to the extent to which attrition from the pharmacy degree occurs, enabling workforce planners to estimate future intake onto the professional register.

Keywords: *Attrition, completion rate, MPharm, pharmacy, Schools of Pharmacy, UK*

Introduction

Workforce shortages in the pharmacy profession, and their consequences (recruitment problems, vacant posts and curtailment of services), have been much debated recently (Hassell, Fisher, Nichols, & Shann, 2002; Scott, 2002). Lower levels of labour market activity among the existing workforce, and in particular the work patterns of the increasingly large proportion of women in the profession, has been identified as a major contributor to the current supply problem (Hassell et al., 2002). Others have argued that the lack of pharmacists entering the profession has also contributed to staff shortages (Audit Commission, 2001).

While there are workforce supply shortages, it also appears, counter-intuitively, that the number of students being accepted onto pharmacy courses has

increased annually for several years now, with some researchers identifying a 30% increase between 1998 and 2003 (Wilson, Jesson, Langley, Hatfield, & Clarke, 2006). In fact, largely because of fears about shortages, the number of schools of pharmacy in the UK, after a considerable period of stability, has risen to a total of 22 (<http://www.pharmacycareers.org.uk/>). Moreover, during the next few years it appears that an increasing number of institutions will start to offer the MPharm degree to prospective students. Although the number of new pharmacy schools that will begin to operate remains to be seen, the pharmacy student population looks set to rise (Taylor, Bates, & Harding, 2004).

While raising the student intake is clearly one obvious solution to addressing shortages in the profession, one problem is that there is little published

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information about completion rates for pharmacy students. Nor is it readily apparent what proportion of graduates complete their pre-registration year and eventually join the pharmaceutical register. This means the strategy of increasing undergraduate pharmacy intake is not necessarily well informed and managers with responsibility for workforce planning have no data to inform initial assumptions about what proportion of the original inflow to pharmacy degree programmes translates into entry to the register and then to actual practice.

A recent conference paper highlighted some of the problems associated with a secondary analysis of student graduation and data relating to non-completion of pharmacy degrees—or attrition—and called for further detailed work to explore the nature and extent of this attrition within pharmacy (Hassell, 2005).

Across all courses in general, the UK higher education (HE) system has maintained one of the highest completion rates compared with other major industrialised nations. However, recent evidence indicates that non-completion rates for the UK are now rising. In 1999 statistics gleaned from English HE institutions gave rise to claims that one in four students were dropping out before completing their courses (Goddard, 1999). Lower socio-economic status, mature entry, being from certain ethnic groups, late starting, living at home and being male, are among factors which researchers have identified as being related to non-completion of HE programmes in the UK (Yorke, 1999). While students may drop out voluntarily or leave involuntarily because of academic failure (Tinto, 1982), theories of attrition suggest that it is interrelationships while at university that are critical in determining whether students complete their degree course (Spady, 1970). Social and academic integration, then, prevent students from social or academic failure—that is, they prevent students from dropping out.

The government has also recognised the problem of non-completion in higher education and in 2001, a select committee called for “the Government, HEFCE and to higher education institutions to take action to reduce as far as possible the number of students who do not achieve a recognised qualification” (Select Committee on Education and Employment, 2001).

Against this background then, the aim of this paper is to describe work undertaken to inform the debate within pharmacy, highlighting the extent to which attrition occurs and for whom it is a problem. The paper includes analysis of the number of students applying to pharmacy courses and the numbers being accepted, as well as analysis of actual register data to provide an historical view of annual intake onto the pharmaceutical register; attrition over time is explored, and attrition by student type, gender and school of pharmacy is described.

Method

Data from a number of sources have been used to explore attrition. To describe applications and accepts to pharmacy degree courses, data from the University Central Admissions Service (UCAS) were used. A simple comparison is made between the number of students applying to study pharmacy and the number of students accepted onto the pharmacy degree. These data included only those who applied for pharmacy as a first choice and those who were accepted, excluding those who entered through the clearing route. Unfortunately, recent changes to the way in which UCAS collates application data, which have resulted in applications and accepts for pharmacy being combined with pharmacology and toxicology, mean that it is not possible to provide this information from 2002 onwards.

Data from the Royal Pharmaceutical Society of Great Britain (RPSGB) are likely to give a far more accurate picture of the real growth in student numbers to pharmacy because they represent places *taken up* by new students, so these data are examined as well. Since 1998, the RPSGB has collated pharmacy student numbers using data provided by each of the institutions that run an undergraduate pharmacy degree programme. Data can be accessed about the number of new students each year, the number of students in each of the years of study, and the number of degree awards. Some, but not all of this information, is provided at an institutional level and some of the information is also presented by gender and home/EU or overseas status.

By comparing the number of students who pass the pre-registration examination with the number of 1st year entrants at the start date five years earlier, it is possible to develop a measure of attrition for this period. The pre-registration exam is significant because students must pass the exam and successfully complete a period of training before they can enter onto the RPSGB register of pharmacists. Attrition rates from 1st year entry to pre-registration exam success for 1997–2000 cohorts were calculated using RPSGB figures. Attrition rates for the 2001–2004 cohorts were calculated by using RPSGB figures for the number of 1st years in each of these cohorts and then calculating attrition based on the average attrition rate (9.5%) for the period 1997–2000. A note of caution is urged here, as not all the students taking the pre-registration exam in a given year will have entered at the same point. A small percentage of candidates will be students with an overseas pharmacy qualification who are taking the exam with a view to practising in the UK. In addition, some of the candidates will be retaking the exam: students are allowed to retake up to three times. The same is true of course, of the students on each year of the pharmacy course, with some re-taking a year and therefore not

necessarily belonging to the corresponding year of entry to the programme.

The final data set used was from the Higher Education Statistics Agency (HESA). HESA collects and disseminates data from publicly funded higher education institutions in the UK. Comparative data on the performance of institutions in widening participation, student retention, learning and teaching outcomes, research output and employment of graduates is published online (www.hesa.ac.uk, 2006). Data from HESA is used in the paper to place pharmacy attrition in context.

The limited data were subjected to time series analysis to determine whether any trends over time were apparent in the patterns of applications, entrants and attrition rates. The results of the time series analysis should be approached with caution, however, as it is possible that autocorrelation may exist (Box, Jenkins, & Reinsel, 1994). Autocorrelation describes the correlation between members of a time series of observations. Although the existence of autocorrelation does not by itself bias coefficients, it can result in biased estimates of standard errors and *t*-tests. Given the limited number of data points in the dataset a decision was taken not to test for autocorrelation or to perform any corrective modelling. Differences between home and overseas students, and male and female students were examined in terms of relative risk (RR). All calculations were undertaken in STATA (v.9) and a threshold of $p < 0.05$ was used to indicate statistical significance.

Results

Number of pharmacists on the RPSGB Register

Analysis of the RPSGB Register indicates that the number of pharmacists joining the Register continues to increase. The proportion of female pharmacists on the Register is rising annually. Table I shows details of the number of pharmacists on the Register between 2003 and 2006 and a gender breakdown of new entrants in the same time period.

Table I. Number of registered pharmacists by year and gender (2003–2006).

| Year | 2003 | 2004 | 2005 | 2006 |
|--------------|--------|--------|--------|--------|
| The Register | | | | |
| Male | 22,152 | 22,396 | 21,193 | 20,949 |
| Female | 24,233 | 25,182 | 25,203 | 26,119 |
| Total | 46,385 | 47,578 | 46,396 | 47,068 |
| Entrants | | | | |
| Male | 806 | 826 | 837 | 853 |
| Female | 1,340 | 1,450 | 1,575 | 1,751 |
| Total | 2,146 | 2,276 | 2,412 | 2,604 |

Source: RPSGB (2006).

Number of applicants and accepts to pharmacy

UCAS data for the period 1996–2001 for applicants and accepts to pharmacy degrees is shown in Figure 1. The figures show that between 1996 and 2001 there was some fluctuation in the number of applicants each year, although the number fell overall from 1996 to 2001. On the other hand, the number accepted onto the course rose year on year, with larger increases apparent in 1997 and 2001 (figures after 2001 combine pharmacy with toxicology and pharmacology so are not included in the graph).

The figures indicate an overall 3.8% decrease in the number of applicants to UK Schools of Pharmacy between 1996 and 2001, the last year for which accurate data are available. Although there is a mean cumulative decrease of 0.7% each year over the period, the number of applicants fluctuated and the time series analysis suggested that there was no overall trend in the number of applicants to pharmacy ($p = 0.92$).

The proportion of applicants who are *accepted* onto the MPharm rose from 58.0% of all applicants in 1996 to 77.5% in 2001, while the number of accepted applicants increased by 28.4% in the six years shown. The time series analysis suggested a rising trend in the number of accepted applicants over the time period shown ($p = 0.001$).

Students studying pharmacy

Based on data provided to the RPSGB by the individual schools of pharmacy (which are thought to be different from UCAS entrants data above because they are more likely to reflect places actually taken up by students offered a place), the numbers of students entering the pharmacy undergraduate course (Figure 2) has increased over the past few years, from just above 1500 in 1994 to just below 2500 in 2004, a 60.7% increase in student numbers in the decade. Again, time series analysis showed a significant rising trend in the number of entrants to pharmacy each year shown ($p = <0.001$).

Completion of the pharmacy degree: Overall attrition from entry to completion

Figure 3 shows the attrition rates for each of the cohorts entering the pharmacy degree programme in the years 1994–2000. While attrition reached a peak (19%) in the 1997 cohort (the year the pharmacy degree was changed to the four-year MPharm), before falling in 1998 and rising again in 1999 and 2000, time series analysis found no significant trend in the data ($p = 0.612$).

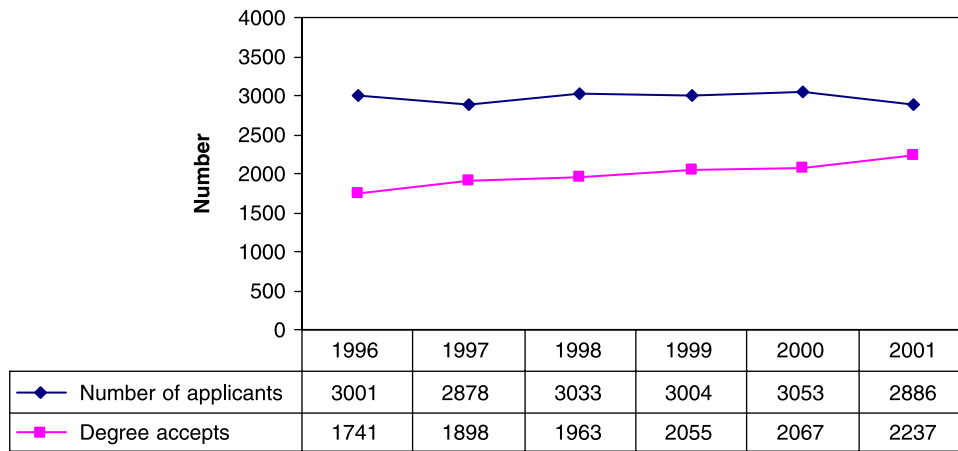


Figure 1. Applications and accepts to pharmacy 1996–2001 (UCAS).

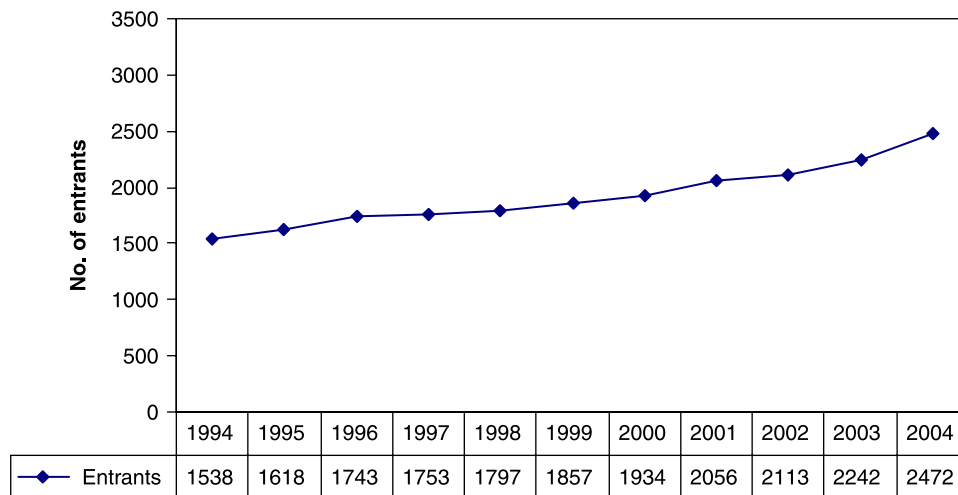


Figure 2. Number of new entrants to pharmacy 1994–2004 (RPSGB data).

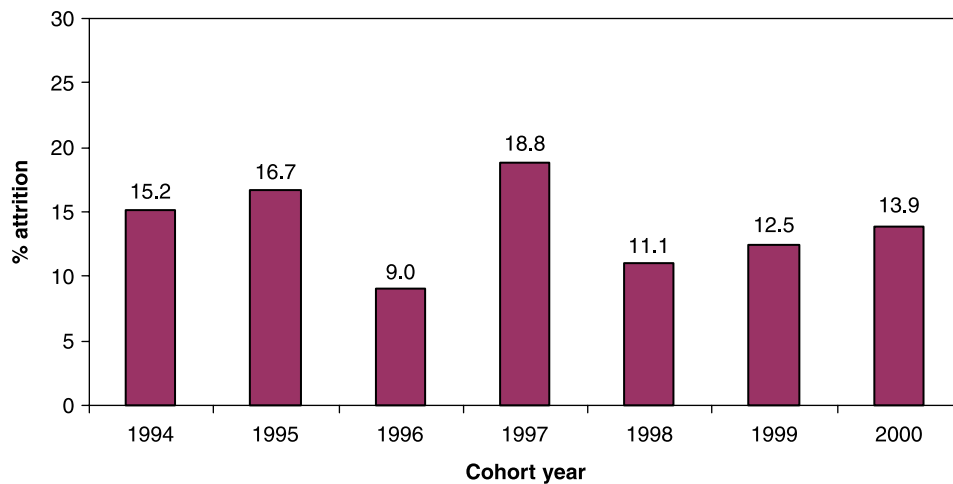


Figure 3. Attrition rates (1994–2004).

Attrition by institution

Annual attrition varies from institution to institution: this trend is illustrated in Figure 4, which gives attrition by (anonymised) school for the 2000 entry cohort. This indicates that attrition ranges from 3.6 to 35.5% for different schools of pharmacy for this cohort. Institutions which offer a sandwich course were not included in this figure.

Attrition for home/EU students and overseas students

A comparison of attrition rates for home and EU students and overseas students suggests that attrition rates are consistently higher amongst overseas students (Figure 5). Although attrition rates have fallen for overseas students since the peak of 45% in the 1997 cohort, overseas students are still more likely to drop out than their home/EU counterparts. Expressed in terms of RR, overseas students were at

greater risk of dropping out than their home/EU counterparts in all four cohort years shown (2.9, 2.0, 2.6 and 1.4 in 1997–2000, respectively).

Attrition by gender

Attrition rates were also compared by gender. The results in Figure 6 show that male students were more likely than female students to fail to graduate at the end of their course. The average proportion of female pharmacy students gaining a degree between the years 2001 and 2004 was 90.2%, compared with 82.8% for male students during the same period. The RR for male students dropping out compared with female students is 2.5, 1.5, 2.0 and 1.6, respectively, for each of the years shown. Both home/EU and overseas male students have higher rates of attrition than their female counterparts in the 1997–2000 cohorts, mirroring the overall gender split.

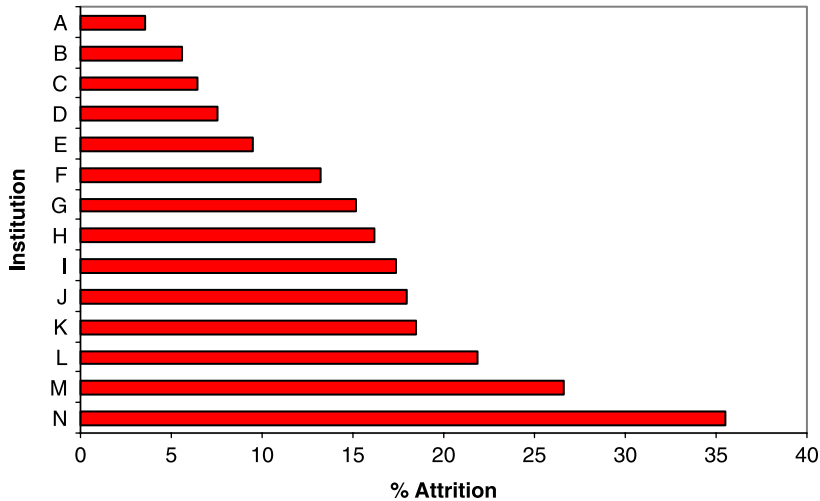


Figure 4. Attrition for 2000 cohort by institution.

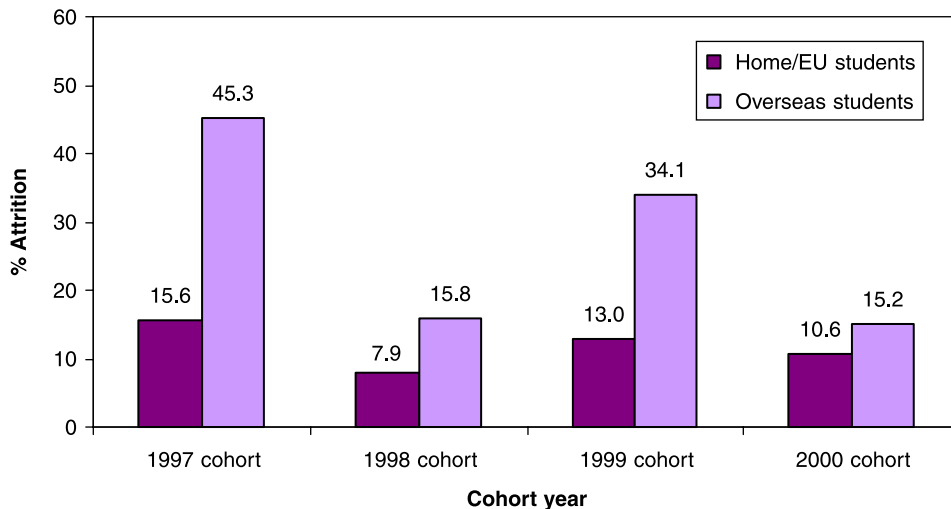


Figure 5. Attrition rates by student type.

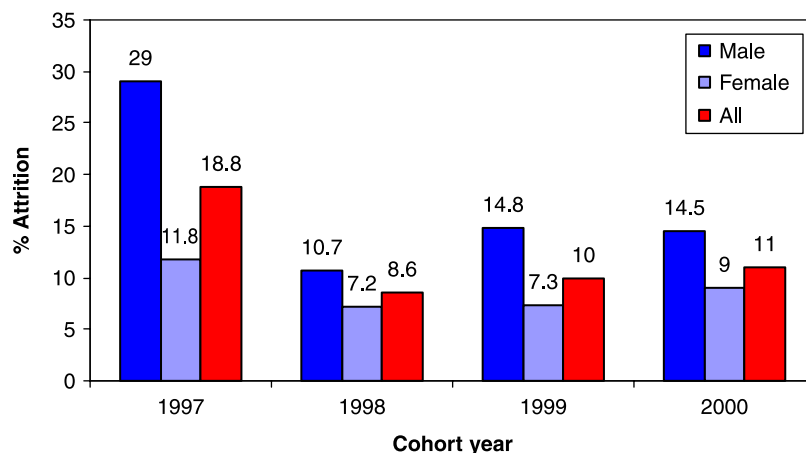


Figure 6. Attrition by gender.

Comparison between number of 1st year entrants and pre-registration exam awards

This graph (Figure 7) compares the number of 1st year entrants in a given cohort year with the number of pre-registration passes five years later. Belfast pharmacy students have been excluded from these calculations as the majority go on to take the Pharmaceutical Service of Northern Ireland pre-registration exam. Projected figures have been used for the 2001–2004 cohorts (see Method section for details; Attrition ranges between 8.3% for the 1997 cohort and 11.1% for the 1999 cohort. The mean attrition rate between 1997 and 2000 was 9.5%. It is important to remember that these rates may underestimate attrition, as some of the candidates sitting the pre-registration exam may be overseas pharmacists sitting the exam in order to work in the UK. In

addition, it is not possible to determine what proportion of candidates is re-taking the exam after a previous failure.

Placing pharmacy attrition into context

HESA provides UK-wide, country-level and institution-level figures for students who were no longer in higher education one year after starting their course and also makes projections on the number who will emerge without a degree at the end of the course. In terms of projected attrition at the end of the degree course, the figure for 2003/2004 for the UK was 14.9%. The figures for England, Scotland, Wales and Northern Ireland were 14.4, 17.5, 15.4 and 17.1%, respectively. The most up to date information on attrition rates in pharmacy for students who

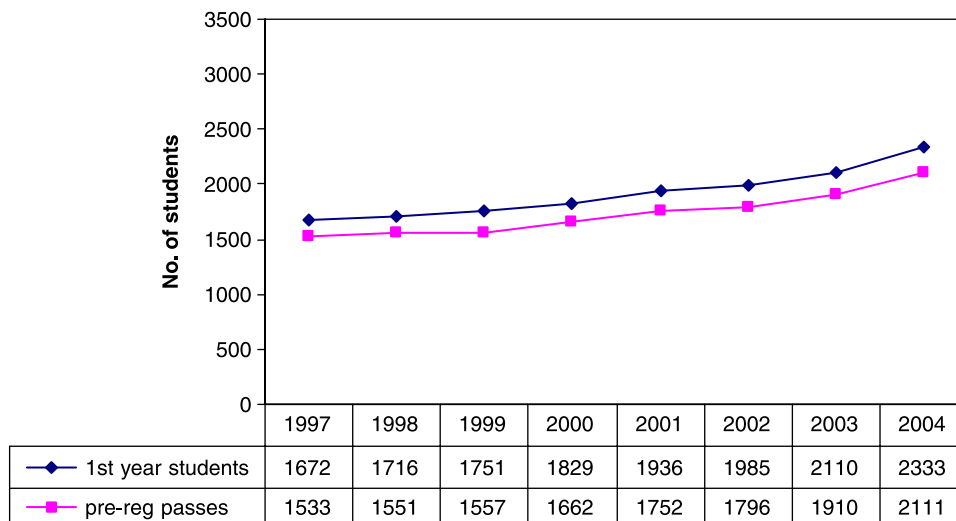


Figure 7. Comparison of first-year entrants and pre-registration exam success (1997–2004 cohorts).

completed their studies in 2004 (as shown in Figure 3) indicates that attrition then stood at 13.9%, which, although rising, is less than the overall figures for all higher education courses.

Discussion

Although there appears to be no trend in the data on applicants to pharmacy, the number of entrants to pharmacy is increasing, and seems set to continue to rise in the next few years as more new schools of pharmacy open. One consequence of the decreasing number of applicants vs. the growing number of places and students, in the long term at least, is that institutions may have to lower entry standards to fill places on their courses. As Taylor & Bates (2003) argue: "If students are sought from a stationary or shrinking pool there are inevitably implications for the quality of the applicants, with students having poorer academic ability than was previously the case being recruited to fill available university places". Given that attrition can be caused by students' inability to deal with the demands of the course programme (Select Committee on Education and Employment, 2001), it is possible that attrition may rise if less able students are recruited.

Attrition from 1st year entry to graduation appears to have peaked in 2001, the first year that pharmacists who began the new four-year MPharm graduated. Attrition is particularly high among overseas students suggesting that retention measures could effectively be targeted at this group. Previous studies have shown that attrition is higher amongst overseas than home students for all course studied at traditional universities (defined as pre 1992 universities), other things such as A-level score, family background, subject studied etc being equal (Johnes & McNabb, 2004). In the case of overseas students, factors such as language issues, financial difficulties or personal or family commitments may be contributing to problems that cause them to drop out, rather than factors specific to the course or the ability of the student. Critics argue that the social and cultural bias of the UK educational system undervalues the knowledge and practices of some groups of students, including those from overseas and from certain socio-economic backgrounds, and that it is this which makes these students more inclined to withdraw early—or drop out from their course (Thomas, 2002).

The results also indicate a gender split in attrition, with females consistently more likely than male students to graduate successfully. Researchers have suggested that students in courses with a high proportion of women make more progress than students in courses with a high male-to-female ratio (Beekhoven, De Jong, & Van Hout, 2003). Other studies (Johnes, & McNabb, 2004) have demonstrated that the gender mix of students affects

performance, with attrition higher for male students on courses where female students are in the majority. Completion rates amongst female students, conversely, are higher if they study courses where the gender mix involves an over-representation of female students. Given the growing feminisation of the pharmacy student population, one would expect attrition overall, to be falling. However, this does not seem to be the case, unless, of course, attrition is rising amongst the male pharmacy students at a greater rate than it is for the female students. This issue merits further research.

In terms of pre-registration exam success, it would appear that the majority of students pass the exam as expected and will therefore enter onto the RPSGB register. However, the fact that a small proportion of students fail to make it onto to the Register each year is an important finding.

It is important to place pharmacy attrition into context. When comparing attrition with figures for HE in general, pharmacy compares relatively favourably. It is also important to take into account the limitations of the data sets used to describe pharmacy attrition. Nonetheless, this paper suggests that attrition is a real issue in GB pharmacy education. Despite a growing number of students entering pharmacy degrees it cannot be assumed that all students who start the course will continue through to pre-registration exam and ultimately to registration on the RPSGB pharmaceutical register. It is important for workforce planners to be aware of anticipated attrition rates, as this may influence the number of pharmacy degree places made available. It will also be essential to follow attrition carefully in the next few years to see how significant changes in pharmacy education, in particular the proliferation of new schools of pharmacy, impact on attrition levels. This paper presented overall attrition for all schools of pharmacy together, and anonymised data on each school separately. While these data provide a general indication of how pharmacy students fare over the duration of their training, analysis at an institution level would shed light on variation across locations. This is likely to be particularly important as the new schools come on-stream.

Attrition is a multi-faceted issue and there are likely to be many factors, both extrinsic and intrinsic to the individual student, which determine which students are likely to drop out. Qualitative research to explore these issues with pharmacy students would provide valuable information that might help institutions identify individuals who are likely to drop out and to target them with retention measures.

Conclusion

An understanding of attrition rates is important because it allows workforce planners and policy

makers to estimate the number of new pharmacists that can be expected to join the register each year. However, this can only be achieved with accuracy if data are clearly defined. One of the key difficulties in exploring attrition in pharmacy lies in the quality of the data that can be used. Changes to the way in which UCAS processes data on applications to undergraduate courses means that it is no longer possible to determine how many individuals are applying to study pharmacy. Although the RPSGB now produces annual data providing comprehensive information on the number of students entering pharmacy and the number of degrees awarded, a number of difficulties remain. It would be useful, for example, if the RPSGB could record the number of sandwich course students who are in their fifth year of study, rather than including these individuals within the fourth year numbers. In terms of the pre-registration examination, it would be useful to know what proportion of entrants and successful candidates are home/EU students and what proportion are taking the exam for the first time. At present it is difficult to track a cohort from 1st year to pre-registration success with absolute certainty. If data were collected longitudinally, it would be possible to explore the ways that drop out behaviours vary over time, and may differ for different types of students. A greater understanding of the causes of attrition might also make it possible to design institutional strategies to address these different behaviours in appropriate ways, so that accurate projections of the numbers of graduating students can be made.

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References

- Audit Commission. (2001). *A spoonful of sugar-medicines management in NHS hospitals*. London: Audit Commission.
- Beekhoven, S., De Jong, U., & Van Hout, H. (2003). Different courses, different students, same results? An examination of differences in study progress of students in different courses. *Higher Education*, 46, 37–59.
- Box, G. E. P., Jenkins, G. M., & Reinsel, G. C. (1994). *Time series analysis: Forecasting and control*, 3rd ed. Englewood Cliffs, NJ: Prentice Hall.
- Goddard, A. (1999). One in four students drops out. *Times Higher Educational Supplement*. 19th March.
- Hassell, K. (2005). Unpacking attrition: The pharmacy undergraduate course and beyond, University of Reading: 11th Health Services Research and Pharmacy Practice Conference. Volume of Abstracts.
- Hassell, K., Fisher, R., Nichols, L., & Shann, P. (2002). Contemporary workforce patterns and historical trends: The pharmacy labour market over the past 40 years. *Pharmaceutical Journal*, 269, 291–296.
- Johnes, G., & McNabb, R. (2004). Never give up on the good times: Student attrition in the UK. *Oxford Bulletin of Economics and Statistics*, 66, 23–47.
- Scott, D. (2002). NHS hospital staffing: Status quo or ebb and flow? *Hospital Pharmacist*, 9, 200–203.
- Select Committee on Education and Employment. (2001). *Sixth report*. London: HMSO.
- Spady, W. (1970). Dropouts from higher education: An interdisciplinary review and synthesis. *Interchange*, 1, 64–85.
- Taylor, K., & Bates, I. (2003). Pharmacy student numbers are bound to affect educational standards. *The Pharmaceutical Journal*, 271, 546.
- Taylor, K., Bates, I., & Harding, G. (2004). The implications of increasing student numbers for pharmacy education. *Pharmacy Education*, 4, 33–39.
- Thomas, L. (2002). Student retention in higher education: The role of institutional habitus. *Journal of Education Policy*, 17, 423–442.
- Tinto, V. (1982). Limits of theory and practice in student attrition. *The Journal of Higher Education*, 53, 687–700.
- Wilson, K. A., Jesson, J. K., Langley, C. A., Hatfield, K., & Clarke, L. (2006). *Pharmacy undergraduate students: Career choices and expectations across a four-year degree programme*. London: Royal Pharmaceutical Society of Great Britain.
- Yorke, M. (1999). *Leaving early: Undergraduate non-completion in higher education*. London: Falmer Press.