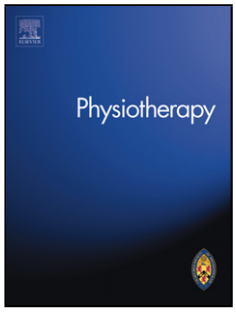

Title: Identifying factors that predict attrition among first year physiotherapy students: a retrospective analysis

Authors: Jennifer M. Ryan, Tara Potier, Alison Sherwin, Elizabeth Cassidy

PII: S0031-9406(17)30030-5
DOI: http://dx.doi.org/doi:10.1016/j.physio.2017.04.001
Reference: PHYST 965

To appear in: *Physiotherapy*

Please cite this article as: Ryan Jennifer M, Potier Tara, Sherwin Alison, Cassidy Elizabeth.Identifying factors that predict attrition among first year physiotherapy students: a retrospective analysis.*Physiotherapy* http://dx.doi.org/10.1016/j.physio.2017.04.001

Title

Identifying factors that predict attrition among first year physiotherapy students: a retrospective analysis

Authors

Jennifer M. Ryan[a] BSc (Hons) PhD, Tara Potier[a] BSc (Hons), MSc, Alison Sherwin[a] Grad Dip Phys, MA, Elizabeth Cassidy[a,1] Grad Dip Phys, MSc, PhD

[a]Department of Clinical Sciences, Brunel University London, Kingston Lane, Uxbridge UB8 3PH UK

jennifer.ryan@brunel.ac.uk; tara.potier@brunel.ac.uk; alison.sherwin@brunel.ac.uk; elizabeth.cassidy73@gmail.com

Correspondence (for review)

Name	Dr Elizabeth Cassidy
Address[1]	Independent Academic Consultant and Researcher Villefortgasse 15/1/6 Graz 8010. Austria (present address)
Tel	None
Mob	+43 688 6088 6530
Fax	None
Email	elizabeth.cassidy73@gmail.com

Correspondence (post-publication)

Name	Dr Jennifer M. Ryan
Department	Department of Clinical Sciences
Address	Brunel University London, Kingston Lane, Uxbridge UB8 3PH UK
Tel	01895 268702
Email	jennifer.ryan@brunel.ac.uk

Word Count: 2555 words

Ethical Approval: The University Research Ethics Committee approved this study. Informed consent was waived by the Committee. All data

were anonymized. REC no. 14/4/STF/12

Contribution of the Paper

New Knowledge

- This was the first study to look at the percentage drop-out and causes of attrition among first year physiotherapy students in the UK
- A high percentage drop-out was identified
- Attrition in first year was particularly high among students from ethnic minority backgrounds and students who lived off-campus

Key Messages

- Effective strategies to retain students from ethnic minority backgrounds in physiotherapy programmes need to be identified.
- Assessment results should be analysed by ethnic group and placed in the public domain
- Further qualitative research is required to understand the reasons why students from ethnic minority backgrounds and students who live off campus are more likely to drop-out of physiotherapy programmes in their first year

Key words: Attrition; drop-out; logistic models; students; ethnic groups; physiotherapy

INTRODUCTION

Attaining a place on a pre-registration physiotherapy programme is difficult. Despite this, a number of students leave physiotherapy every year. Leaving a physiotherapy programme before completion can have financial, social and emotional consequences for a student. A high rate of attrition may also negatively impact an institution's reputation, and staff morale. Despite the potential impact of attrition on students and institutions, only one Australian study to date has reported the rate of attrition among physiotherapy students. This study reported the rate of first year attrition from five physiotherapy programmes in Australia as 11%, significantly lower than the average rate of 25% for all Australian university students [1]. Although these figures suggest that the rate of attrition is low among physiotherapy students, in the UK only 6% of all first degree university entrants aged under 21 fail to continue their studies beyond the first year [2]. As the attrition rate for physiotherapy programmes in the UK is not known, further studies are required to determine whether attrition rates in the UK are comparable with those in Australia, and therefore potentially a cause for concern.

Several studies have investigated the factors associated with attrition from medical and nursing programmes. Factors that were considered include gender, age, ethnicity, academic achievement, and social isolation. The evidence that gender and age on admission are associated with drop-out in medical students remains equivocal [3,4,5]. One review suggested that ethnicity was not associated with attrition [3] but the effect of ethnicity was accounted for in only four of thirteen studies included in the review. More recent studies [4,5,6,7] did not include ethnicity as

a possible influencing factor in their analyses. Perhaps unsurprisingly medical and nursing students with higher admissions qualifications and higher admissions scores are more likely to complete the course [3,4,5,8]. Some studies also suggest that students with science qualifications are less likely to drop out of medical school [5,9,10]. Of the students who dropped out of one medical school in Ireland, social isolation was documented in 20% of students' files [6]. Similarly students living off campus were more likely to drop out of medical school in their first year of study [10]. Although the impact of social isolation on performance has not been investigated among physiotherapy students, physiotherapy students from overseas or for whom English is not a first language report loneliness as a much greater source of stress than English speaking students [11].

Adjusting to university can be challenging for some students, and many students who drop out of university do so in their first year [5,6,7,10]. Attempting to juggle personal and family commitments with academic workload can be a source of stress for students in first year [12]. A study of medical students in the UK indicated that mature students (at least 21 years of age), male students, and students who did not live on campus were more likely to drop out in the first year [10]. Although many students who drop out in their first year of study simply change their mind about the course [12], personal or family health problems are also reasons for voluntary withdrawal [7]. While many academic staff attempt to support students, a small number of nursing students reported receiving conflicting guidance or poor support [12].

Available data suggests that the rate of attrition from physiotherapy programmes is highest in the first year of study [1]. However, to date, no study has investigated the rate or predictors of attrition among first year physiotherapy students in the UK. Differences between

physiotherapy and medical programmes, in terms of course content and structure, mean that it cannot be assumed the factors that predict attrition among physiotherapy students are similar to those reported among medical students. Research into the factors that contribute to attrition among physiotherapy students is needed to inform the selection process, teaching and curriculum, and student support services. The aim of this study was to report the rate of attrition, reported as percentage drop-out in first year, among students on a BSc (Hons) physiotherapy programme in the UK across the period 2010-13, and to identify factors that contributed to attrition.

METHOD

Design

A retrospective analysis was conducted using data from students enrolled on a physiotherapy programme at one university in the UK from 2010-13. Data were obtained from the university's main student record database.

Dependent variables

Drop-out, i.e. whether or not a student dropped out in first year, was identified as the dependent variable. The term "drop-out" refers to any student who failed to continue their studies to the second year of the programme, and includes those who left voluntarily and those who were withdrawn from the programme by the university e.g. for academic failure. Although this term is not completely satisfactory, it is an accepted term in the literature [see for example 3,5,6,10].

Drop-out was subcategorised further into 1) drop-out due to failing and subsequently being withdrawn from the programme and 2) drop-out due to withdrawing from the programme voluntarily. This information was obtained from the database and confirmed against student files.

Independent variables

Where available the following data were obtained: gender, age at time of entry to the course, mode of admission, place of residence categorised as living on campus or other determined using the student's postcode, ethnicity, fee status, level of education, and declaration of a learning difficulty, disability, physical or mental health condition. Binary indicators were created for age (standard entry < 21 years or mature entry ≥ 21 years), mode of admission (3-year full-time route or 4-year part-time route), place of residence (living on campus or other), and fee status (home or overseas including EU). Ethnicity was categorised as white British, Asian, Black, and Other as these categories are recognised as widely representative in the literature [13]. White British served as the reference category. Education attainment at time of entry was categorised as A levels, BTEC extended diploma (secondary school leaving qualifications), university degree, access to higher education diploma, or other, with A levels serving as the reference category. Disability was categorised as "no disability", "learning difficulty", and "disability, physical or mental health condition". "No disability" served as the reference category. Of the students who had information available on A level results, indicator variables were created for 1) whether or not a student achieved a B grade in A level Biology, as this is an entry criteria for the programme based on the assumption that students with a science qualification are less likely to drop-out, and 2) whether or not a student completed A level examinations more than once.

Data analysis

Descriptive statistics are reported as frequencies and percentages. A Chi-square test was used to determine if there was a difference in the number of students who left in year one across the years 2010-13.

For each dependent variable (i.e. drop-out, drop-out due to failure, and drop-out due to voluntary withdrawal) a logistic regression model was fitted. Firstly, univariable analyses were conducted to determine the association between each dependent variable and each independent variable (gender, age at time of entry, mode of admission, place of residence, ethnicity, fee status, education, disability, whether or not the student obtained a B in Biology at A level, and whether or not the student repeated A level examinations). Independent variables that were found to be significantly associated with dependent variables in the univariable analysis (at $p<0.20$) were included in the multivariable model. All analyses were completed with SPSS, version 20 (IBM corporation).

RESULTS

Data on 338 students were included in the analysis; 80 students in 2010, 87 students in 2011, 97 students in 2012, and 74 students in 2013. Sociodemographic data is presented in Table 1. The majority of students were female, standard entry students (i.e. <21 years), white British, enrolled on the 3-year full time programme, and living on campus. Of the students who had A level data available (n=231), 230 students had information on whether or not they had a B in A level Biology, and whether or not they took their A level examinations more than once available. Of these, 191 (83%) had a B in A level Biology and 20 (9%) had taken their A level examinations more than once.

The percentage drop-out was 17% across the years 2010-2013. Thirty-eight students (11%) failed and were withdrawn and 20 students (6%) withdrew from the programme voluntarily. There was no evidence of a difference in percentage drop-out across the years 2010 to 2013 (19% in 2010, 18% in 2011, 20% in 2012 and 11% in 2013; p=0.434).

The percentage drop-out across sociodemographic data is presented in Table 2. No student with an access to higher education diploma was identified as a drop-out due to failure, and no student with a BTEC, with a disability, or who had repeated A level examinations, respectively, was identified as a drop-out due to voluntary withdrawal in the years 2010-13. These categories were therefore not included in the respective logistic regression models. The results of the univariable analysis are presented in Table 3. Place of residence, ethnicity, fee status, education and disability were associated with drop-out (all $p<0.20$). Ethnicity, fee status, education and disability were associated with drop-out due to failure (all $p<0.20$). Age at time of entry, mode of admission, place of residence, ethnicity, education, and obtaining a B in A level Biology were associated with drop-out due to voluntary withdrawal (all $p<0.20$). We did not include whether or not a student obtained a B in A level Biology in the final model as this data was only available on 230 students.

The results of the multivariable analysis are presented in Table 4. When adjusted for covariates, there was strong evidence that Black and Asian students had greater odds of drop-out compared to white students (Odds Ratio (OR): 6.23; 95% Confidence Interval (CI): 1.79-21.63, and OR: 6.43; 95% CI: 3.03-13.68, respectively). Black and Asian students also had greater odds of drop-out due to failure compared to white students (OR: 5.50, 95% CI: 1.27-23.70, and OR: 7.19; 95% CI: 3.02-17.08, respectively), but they did not have greater odds of drop-out due to

voluntary withdrawal.

Regardless of ethnicity, there was some evidence that students who had completed a previous degree were less likely to drop out for any reason (OR: 0.30; 95% CI: 0.09-0.88) or drop out due to failure (OR: 0.11; 95% CI: 0.01-0.76). There was also some evidence that students with a learning difficulty were less likely to drop out for any reason compared to students with no disability (OR: 0.28; 95% CI: 0.09-0.88). Finally, there was some evidence that students who lived off campus had greater odds of withdrawing from the programme irrespective of ethnicity (OR: 4.65; 95% CI: 1.41-15.34).

DISCUSSION

The results of this study indicated that the percentage drop-out among physiotherapy students in first year was significantly higher than that reported for physiotherapy programmes in Australia [1], and for first year medical students in the UK [10]. Ethnicity was the strongest predictor of drop-out among physiotherapy students in first year. Ethnicity was also the strongest predictor of academic failure in year one, with Asian students having approximately 7 times the odds of failing compared to white British students. Living off campus was the strongest predictor of a student voluntarily withdrawing from the programme. Students with a previous degree or a learning difficulty had reduced odds of drop-out regardless of ethnicity. This is the first study to investigate the factors associated with attrition from physiotherapy programmes. The findings are consistent with studies investigating factors associated with success on physiotherapy programmes [14,15] but are not unique to physiotherapy [10,16].

Of concern, 45% of Asian students did not progress to second year of this physiotherapy programme because of academic failure. Although, it has been suggested that examiner bias in practical assessments may account for poor academic performance among students from minority ethnic backgrounds, this was not found to be a contributing factor to poor performance among medical students [16]. Previous research has found that academic achievement prior to admission is consistently predictive of academic success at university [4,5,8,9,10]. Although there is an implicit assumption that academic performance prior to admission is equal between students from white and ethnic minority backgrounds, this may not be true [17]. The measure of academic achievement used in this study was likely too crude to identify the impact of prior academic achievement on admission. Future studies should investigate if the association between ethnicity and academic failure is independent of points attained at A level. Similar to previous studies [5,8], we found that students who had a degree were more likely to progress to second year. This relationship was independent of ethnicity. This finding suggests that experience plays an important role in success on an undergraduate physiotherapy programme. A mentoring system between students who have completed a previous degree and school-leavers should be considered as a method of reducing drop-out.

In comparison to national data which suggests that a lower proportion of disabled students progress or qualify compared to non-disabled students [18], our results indicated that students with declared learning difficulties had reduced odds of drop-out. One possible reason for this may be that students who declare having learning difficulties in their first year may be proactive in seeking help. Furthermore, the sample may have included data from students with undeclared learning difficulties who may be more likely to drop-out than students with declared

learning difficulties. It is impossible to determine the reason for this association however from the current data and the result warrants further investigation.

Cultural, social and personal factors may also play a role in drop-out. In the university where this study took place, 32% of UK-domiciled students were from Black and Minority Ethnic groups, compared to the national average of 20% [19]. Qualitative enquiry has revealed that student physiotherapists from ethnic minority backgrounds feel isolated and unsupported while studying physiotherapy, and perceive physiotherapy to be a white profession [20]. Students from ethnic minority backgrounds may also struggle against the perception in their communities that physiotherapy does not have the same prestige as other professions such as medicine [21]. Universities, as well as local and national professional groups should work more effectively to counter the lack of diversity in physiotherapy.

Regardless of ethnicity, living off campus was predictive of voluntary withdrawal from the programme. Living off campus could be a surrogate measure for a number of personal and financial stressors. Academic and personal stress is known to be high among physiotherapy students [11,22]. This may be increased among students living off campus because of caring or financial circumstances, which when combined with academic stress may place them at high risk of psychological morbidity and subsequent drop-out. Living off campus may also be associated with social isolation, which is a risk factor for drop-out among medical students [3,6]. The relationship between social isolation and drop-out is an interesting one. Social isolation may lead to reduced quality of life and depressive symptoms, which in turn predict thoughts of dropping out [23]. However, personality may be a confounding factor, with students with a shy or timid personality who are more likely to drop-out [3],

choosing to isolate themselves from their peers.

To reduce drop-out, efforts should be made to identify students at risk and to retain them on the programme. A toolkit that uses academic flags (e.g. number of fails at the end of the first period of examinations) and non-academic flags (e.g. living off campus, ethnicity) to identify students at risk of dropout, may be useful on physiotherapy programmes for targeting interventions and minimising resource use [24]. The potential impact of social isolation on success in physiotherapy programmes suggests that peer-assisted learning may be beneficial. Peer-assisted learning is comparable to conventional teaching in terms of academic performance [25,26] and has received positive appraisal by both students and peer educators [27,28]. However, not all struggling students may accept the offer of peer-tutoring [28], and more formal measures may be needed to improve uptake [29].

There are a number of limitations to this study. The results are based on data from one university, and cannot be generalised across all UK universities. However, the results provide further justification to look at attrition more widely across physiotherapy programmes in the UK. The relatively small sample size and small number of students in certain groups resulted in a number of odds ratios having large 95% confidence intervals associated with them. This study needs to be replicated in a larger sample in order to improve the precision of the estimates and confirm or refute the findings of the current study. A further limitation is that no differentiation was made between students from UK or non-UK ethnic minority backgrounds. Although there are important differences between these groups this information could not be determined from the database. Socioeconomic status was also not included as an independent variable. It was not possible to calculate a

precise indicator of socioeconomic status from the data available. However, there is no strong evidence that socioeconomic status is associated with attrition among medical students [3], or with success on a physiotherapy programme [15]; although the study investigating success on a physiotherapy programme included a proxy measure of socioeconomic status and only a small number of students were classified as being from low socioeconomic groups. When a more precise indicator of socioeconomic status is available, it should be examined as a potential predictor of attrition.

In conclusion, a significant number of students from ethnic minority backgrounds failed to progress past the first year of their studies. Students who live off campus may also be at high risk of failing to progress. While issues of ethnicity and equal opportunity in physiotherapy education have been discussed for several years [30], efforts to widen participation will be in vain if a high percentage of students from ethnic minority backgrounds fail to progress through the programme. Strategies should be in place to identify students at risk of dropping out, and to support students from ethnic minority backgrounds. Further studies should explore why students living off campus may be at risk of drop-out. Further qualitative research may help to uncover the personal and social factors that differ between successful and unsuccessful students on physiotherapy programmes. As recommended by Woolf et al [16] assessment results should be analysed by ethnic group and placed in the public domain to support further research.

Funding: Unfunded

Conflict of Interest: The authors declare no conflict of interest

REFERENCES

[1] McMeeken J, Grant R, Webb G, Krause KL, Garnett R. Australian physiotherapy student intake is increasing and attrition remains lower than the university average: a demographic study. Aust J Physiother 2008;54:65-71.

[2] Higher Education Statistics Agency 2016 available at https://www.hesa.ac.uk/news/23-03-2016/performance-indicators-released. (Accessed 1 November 2016)

[3] O'Neill LD, Wallstedt B, Eika B, Hartvigsen J. Factors associated with dropout in medical education: a literature review. Med Educ 2011;45:440-54.

[4] Maslov Kruzicevic S, Barisic KJ, Banozic A, Esteban CD, Sapunar D, Puljak L. Predictors of attrition and academic success of medical students: a 30-year retrospective study. PLoS One 2012;7:e39144. doi: 10.1371/journal.pone.0039144.

[5] Morcke AM, O'Neill L, Kjeldsen IT, Eika B. Selected determinants may account for dropout risks among medical students. Dan Med J 2012;59:A4493.

[6] Maher BM, Hynes H, Sweeney C, Khashan AS, O'Rourke M, Doran K et al. Medical school attrition-beyond the statistics a ten year retrospective study. BMC Med Educ 2013;13:13. doi: 10.1186/1472-6920-13-13.

[7] Yates J. When did they leave, and why? A retrospective case study of attrition on the Nottingham undergraduate medical course. BMC Med Educ 2012;12:43. doi: 10.1186/1472-6920-12-43.

[8] Pryjmachuk S, Easton K, Littlewood A. Nurse education: factors associated with attrition. J Adv Nurs 2009;65:149-60.

[9] Keith L, Hollar D. A social and academic enrichment program promotes medical school matriculation and graduation for disadvantaged students. Educ Health 2012;25:55-63.

[10] Arulampalam W, Naylor R, Smith J. Factors affecting the probability of first year medical student dropout in the UK: a logistic analysis for the intake cohorts of 1980-92. Med Educ 2004;38:492-503.

[11] Tucker B, Jones S, Mandy A, Gupta R. Physiotherapy students' sources of stress, perceived course difficulty, and paid employment: comparison between Western Australia and United Kingdom. Physiother Theory Pract 2006;22:317-28.

[12] Gale J, Ooms A, Newcombe P, Marks-Maran D. Students' first year experience of a BSc (Hons) in nursing: a pilot study. Nurse Educ Today 2015;35:256-64.

[13] Stevenson J. Black and minority ethnic student degree retention and attainment. 2012 Available at: The Higher Education Academy. (Accessed 1 November 2016) https://www.heacademy.ac.uk/system/files/bme_summit_final_report.pdf

14] Williams A, Norris M, Cassidy E, Naylor S, Marston L, Shiers P. An investigation of the relationship between ethnicity and success in a BSc (Hons) Physiotherapy degree programme in the UK. Physiotherapy 2015;101:198-203.

[15] Naylor S, Norris M, Williams A. Does ethnicity, gender or age of physiotherapy students affect performance in the final clinical placements? An exploratory study. Physiotherapy 2014;100:9-13.

[16] Woolf K, Potts HW, McManus IC. Ethnicity and academic performance in UK trained doctors and medical students: systematic review and meta-analysis. BMJ 2011;342:d901. doi: 10.1136/bmj.d901.

[17] McManus C, Woolf K, Dacre JE. The educational background and qualifications of UK medical students from ethnic minorities. BMC Med Educ 2008; 8:21. doi: 10.1186/1472-6920-8-21.

[18] Equality Challenge Unit. Equality in Education: statistical report 2015: part 2 students. http://www.ecu.ac.uk/wp-content/uploads/2015/11/Equality-in-HE-statistical-report-2015-part-2-students.pdf (Accessed 1 November 2016)

[19] Equality Challenge Unit. Equality in Higher Education Statistical Report 2014. http://www.ecu.ac.uk/publications/equality-higher-education-statistical-report-2014/ (Accessed 1 November 2016)

[20] Yeowell G. 'Isn't it all Whites?' Ethnic diversity and the physiotherapy profession. Physiotherapy 2013;99:341-46.

[21] Yeowell G. 'Oh my gosh I'm going to have to undress': potential barriers to greater ethnic diversity in the physiotherapy profession in the United Kingdom. Physiotherapy 2013;99:323-27.

[22] Walsh JM, Feeney C, Hussey J, Donnellan C. Sources of stress and psychological morbidity among undergraduate physiotherapy students. Physiotherapy 2010;96:206-12.

[23] Dyrbye LN, Power DV, Massie FS, Eacker A, Harper W, Thomas MR, et al. Factors associated with resilience to and recovery from burnout: a prospective, multi-institutional study of US medical students. Med Educ 2010;44:1016-1026.

[24] Yates J. Development of a 'toolkit' to identify medical students at risk of failure to thrive on the course: an exploratory retrospective case study. BMC Med Educ 2011;11:95. doi: 10.1186/1472-6920-11-95.

[25] Yu TC, Wilson NC, Singh PP, Lemanu DP, Hawken SJ, Hill AG. Medical students-as-teachers: a systematic review of peer-assisted teaching during medical school. Adv Med Educ Pract 2011;2:157-72. doi: 10.2147/AMEP.S14383.

[26] Ten Cate O, van de Vorst I, van den Broek S. Academic achievements of students tutored by near-peers. Int J Med Educ 2012;3:6-13.

[27] Nelson AJ, Nelson SV, Linn AMJ, Raw LE, Kildea HB, Tonkin AL. Tomorrow’s educators … today? Implementing near-peer teaching for medical students. Med Teach 2013;35: 156-59.

[28] Batz Z, Olsen BJ, Dumont J, Dastoor F, Smith MK. Helping struggling students in introductory biology: a peer-tutoring approach that improves performance, perception, and retention. CBE Life Sci Educ 2015;14:pii:ar16. doi: 10.1187/cbe.14-08-0120.

[29] Steger-Jager KM, Cohen-Schotanus J, Splinter TA, Themmen AP. Academic dismissal policy for medical students: effect on study progress and help-seeking behaviour. Med Educ 2011;45:987-94.

[30] Mason C, Sparkes VJ Widening participation in physiotherapy education: part 2. Ethnicity among undergraduates. Physiotherapy 2002;88,5:276-84

Table 1 Sociodemographic data of students included in the analysis (n=338)

Variable		n (%)
Gender	Male	130 (38)
	Female	208 (62)
Age at time of entry	Mature ≥ 21 yr	110 (33)
	Standard < 21 yr	228 (67)
Mode of admission	Full-time programme	299 (88)
	Part-time programme	39 (12)
Place of residence	On campus	236 (70)
	Other	102 (30)
Ethnicity	White British	258 (76)
	Asian	47 (14)
	Black	15 (4)
	Other	18 (5)
Fee status	Home	316 (93)
	Overseas (including EU)	22 (7)
Disability	None reported	268 (80)
	Learning difficulty	59 (17)
	Disability, mental health or physical health condition	11 (3)
Education	A level	231 (68)
	Degree	54 (16)
	BTEC	7 (2)
	Access to higher education diploma	12 (4)
	Other	34 (10)

Table 2. Number and percentage of drop-outs across gender, age, mode of admission, ethnicity, place of residence, fee status, education, disability and A level profile

Independent variable		Drop-out	Failure	Withdrawal
Gender	Male	23 (18)	16 (12)	7 (6)
	Female	35 (17)	22 (11)	13 (6)
Age at time of entry	≥ 21 yr	19 (17)	9 (8)	10 (9)
	< 21 yr	39 (17)	29 (13)	10 (4)
Mode of admission	Full-time	49 (16)	34 (11)	15 (5)
	Part-time	9 (23)	4 (10)	5 (13)
Place of residence	On Campus	35 (15)	28 (12)	7 (3)
	Other	23 (23)	10 (10)	13 (13)
Ethnicity	White British	27 (11)	17 (7)	10 (4)
	Asian	21 (45)	15 (32)	6 (13)
	Black	5 (33)	3 (20)	2 (13)
	Other	5 (28)	3 (17)	2 (11)
Fee status	Home	50 (15)	33 (10)	17 (5)
	Overseas	8 (36)	5 (23)	3 (13)
Education	A levels	38 (16)	28 (12)	10 (4)
	Degree	6 (12)	1 (2)	5 (10)
	BTEC	2 (29)	2 (29)	0 (0)
	Access	2 (17)	0 (0)	2 (17)
	Other	10 (27)	7 (19)	3 (8)
Disability	No disability	52 (19)	34 (12)	18 (7)
	Learning Difficulty	4 (6)	2 (3)	2 (3)
	Disability[a]	2 (18)	2 (18)	0 (0)
B in Biology at A level[b]	Yes	31 (16)	25 (13)	6 (3)
	No	7 (18)	3 (8)	4 (10)
Repeated A level examinations[b]	Yes	3 (15)	3 (15)	0 (0)
	No	35 (17)	25 (12)	10 (5)

All data presented as n (%). Fail = drop-out due to failure. Withdraw = drop-out due to voluntary withdrawal.
[a]Includes people with a disability, mental health or physical health condition.

[b]Only people with A level data available included in the analysis (n=230)

Table 3. Unadjusted (i.e. univariable) odds ratios, 95% confidence intervals and p-values for the association between each independent variable and drop out, drop-out due to failure, and drop-out due to voluntary withdrawal, respectively

	Dependent Variable: Fail[a]								
Independent variables	Odds Ratio	95% CI	p-value	Odds Ratio	95% CI	p-value	Odds Ratio	95% CI	p-value
Gender (Reference: Female)	1.06	0.60, 1.90	0.837	1.19	0.60, 2.35	0.624	0.85	0.33, 2.20	0.743
Age at time of entry (reference < 21 yr)	1.01	0.55, 1.85	0.969	0.61	0.28, 1.34	0.220	2.18†	0.88, 5.41	0.093
Mode of admission (Reference: Part-time)	0.65	0.29, 1.46	0.300	1.12	0.38, 3.35	0.836	0.36†	0.12, 1.05	0.061
Place of residence (Reference: Living on campus)	1.67†	0.93, 3.01	0.086	0.81	0.37, 1.73	0.583	4.78†	1.85, 12.37	0.001
Ethnicity (Reference: White British)									
Black	4.28†	1.36, 13.45	0.013	3.54†	0.91, 13.77	0.068	3.82†	0.76, 19.23	0.105
Asian	6.91†	3.43, 13.91	<0.001	6.65†	3.03, 14.89	<0.001	3.63†	1.26, 10.53	0.018
Other	3.29†	1.09, 9.94	0.035	2.84†	0.75, 10.76	0.126	3.10†	0.63, 15.36	0.166
Fee status (Reference: Home)	1.84†	1.05, 3.22	0.034	1.56†	0.81, 3.03	0.184	1.88†	0.88-4.03	0.103
Education (Reference: A levels)									
Degree	0.66	0.26, 1.66	0.380	0.15†	0.02, 1.13	0.066	2.43†	0.79, 7.42	0.121
BTEC*	2.03	0.38, 10.87	0.407	3.07†	0.57, 16.59	0.192	-	-	-
Access*	1.02	0.21, 4.82	0.984	-	-	-	4.56†	0.88, 23.62	0.071
Other	1.95†	0.87, 4.38	0.104	1.85†	0.74, 4.63	0.186	2.07	0.54, 7.92	0.287
Disability (Reference: No disability)									
Learning Difficulty	0.30†	0.11, 0.87	0.027	0.24†	0.06, 1.04	0.056	0.51	0.12, 2.26	0.374
Disability[a]*	0.92	0.19, 4.40	0.920	1.53	0.32, 7.38	0.597	-	-	-
B in Biology at A level (Reference: No)	0.89	0.36, 2.19	0.792	1.00	0.97, 1.02	0.806	0.28†	0.77, 1.06	0.061
Repeated A level examinations (Reference: No)*	0.88	0.25, 3.17	0.848	1.00	0.96, 1.04	0.843	-	-	-

[a]Fail = drop-out due to failure; bWithdraw = drop-out due to voluntary withdrawal.

*No students with an access to higher education diploma were identified as a drop-out due to failure; no students with a BTEC withdrew from the programme voluntarily; no students with a disability withdrew from the programme voluntarily; no student who repeated A level examinations withdrew from the programme voluntarily

†p<0.2

Table 4. Adjusted (i.e. multivariable) odds ratios, 95% confidence intervals and p-values for the association between independent variables and drop out

Dependent Variable: Drop-out	Odds Ratio	95% CI	p-value
Model Predictors			
Place of residence (Reference: Living on campus)	2.05	0.96, 4.35	0.062
Ethnicity (Reference: White British)			
Black	6.23	1.79, 21.63	0.004
Asian	6.43	3.03, 13.68	<0.001
Other	2.25	0.64, 7.91	0.206
Fee status (Reference: Home)	1.42	0.68, 2.96	0.348
Education (Reference: A levels)			
Degree	0.30	0.10, 0.93	0.038
BTEC	1.66	0.28, 9.97	0.577
Access	0.64	0.12, 3.43	0.606
Other	0.89	0.32, 2.51	0.827
Disability (Reference: No disability)			
Learning Difficulty	0.28	0.09, 0.88	0.029
Disability	0.75	0.13, 4.37	0.748
Dependent Variable: Drop-out due to failure			
Model Predictors			
Ethnicity (Reference: White British)			
Black	5.50	1.27, 23.70	0.022
Asian	7.19	3.02, 17.08	<0.001
Other	2.70	0.63, 11.55	0.180
Education (Reference: A levels)			
Degree	0.11	0.14, 0.87	0.036
BTEC	3.12	0.51, 18.92	0.218
Other	1.16	0.37, 3.69	0.802
Disability (Reference: No disability)			
Learning Difficulty	0.27	0.06, 1.26	0.094
Disability	1.27	0.21, 7.50	0.794
Dependent Variable: Drop-out due to voluntary withdrawal			
Model Predictors			
Age at time of entry (reference < 21 yr)	0.43	0.04, 4.52	0.478
Mode of admission (Reference: Part-time)	0.93	0.23, 3.81	0.916
Place of residence (Reference: Living on campus)	4.65	1.41, 15.34	0.012
Ethnicity (Reference: White British)			
Black	3.11	0.46, 17.19	0.194
Asian	2.83	0.91, 8.80	0.073
Other	1.87	0.28, 12.55	0.518
Fee status (Reference: Home)			
Degree	1.62	0.13, 19.72	0.704
Access	4.79	0.29, 78.00	0.271
Other	1.54	0.14, 17.18	0.725