

1 **An investigation of the relationship between ethnicity and success in a BSc (Hons) Physiotherapy**
2 **degree programme in the UK**

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14 *Word Count. 2 638*

15 **Abstract**

16 **Objectives:** To explore the potential relationship between ethnicity and achievement within
17 undergraduate physiotherapy education.

18 **Design:** A retrospective analysis of assessment marks awarded for academic and clinical modules.

19 **Setting:** A London university offering undergraduate physiotherapy education.

20 **Participants:** 448 undergraduate students enrolled onto the Physiotherapy honours degree
21 programme between 2005-2009.

22 **Main Outcome Measures:** Marks awarded following academic or clinical assessment. These were
23 modelled through multivariate regression analysis to evaluate the relationship between marks
24 awarded and ethnicity.

25 **Results:** Differences were noted between ethnic categories in final programme success and across
26 academic and clinical modules. Our multivariate analysis demonstrated students from Asian
27 backgrounds had decreased odds of succeeding compared with white British students (adjusted OR
28 0.43 95%CI 0.24, 0.79 p=0.006), as had Black students (adjusted OR 0.42 95%CI 0.19, 0.95 p=0.036)
29 and students from Other ethnic backgrounds (adjusted OR 0.41 95%CI 0.20, 0.87 p=0.020).

30 **Conclusions:** This analysis of undergraduate physiotherapy students illustrated a persistent
31 difference in attainment between students from white British and those from BME backgrounds.
32 Heterogeneity in academic outcomes both within and between minority ethnic groups was
33 illustrated. This study not only reinforces the need to consider ethnicity within physiotherapy
34 education but also raises further questions about why physiotherapy students from BME groups
35 perform less well than their white British peers.

36 **Key Words** Physiotherapy, education, ethnicity

37

38 **Introduction**

39 National Health Service workforce and education strategies aim to train and employ people who
40 reflect the diversity of the local population [1, 2]. Whilst these policies are directed towards
41 improving quality of care, developing a workforce that not only reflects the local population but also
42 understands and respects individual diversity is challenging [3]. Physiotherapists, alongside other

43 health care professionals in the UK, are currently not representative of the diversity evident in the
44 population as a whole [4, 5]. Concerns about this situation have resulted in efforts to widen
45 participation in physiotherapy education, mirroring a parallel focus in Higher Education more
46 generally [6].

47

48 The profile of physiotherapy students in the UK has only recently changed from a dominance of
49 young, white females [7] to a national demographic which includes 30% male and 50% mature
50 entrants [8,9]. The numbers of students entering physiotherapy education from a minority ethnic
51 background is also increasing, from under 5% in 2005 [10] to 12% nationally in 2010 [9]. However, as
52 yet there has been little formal exploration of the impact of diversity on educational achievement
53 and outcome, with the few studies within the UK exploring the impact of gender [8, 12] and entry
54 criteria [11]. Ethnicity, specifically within the UK physiotherapy context, has only been considered in
55 our recent exploratory study [13]. The analysis found a difference in assessed performance on final
56 clinical placements in students from Black and Minority Ethnic (BME) backgrounds. Several other
57 exploratory studies from America have also suggested that physiotherapy students from minority
58 ethnic backgrounds may not be as successful as their white peers [14, 15, 16]. Similar findings have
59 been reported in related health fields including nursing [17] and medicine [18, 19, 20, 21], and in
60 university courses more generally [22] in several countries.

61

62 The studies reported here highlight a potential relationship between ethnicity and achievement in
63 healthcare education in general and physiotherapy education in particular. However, the
64 relationship between achievement in physiotherapy education and ethnicity remains uncertain.
65 Further research is required to understand whether a relationship exists between ethnicity and
66 educational outcome in physiotherapy education.

67 To this aim this study further explored the potential relationship between ethnicity and achievement
68 within undergraduate physiotherapy education. Two specific research questions were addressed:

69 1. What is the relationship between self-identified ethnicity and overall success on an undergraduate
70 physiotherapy programme?

71 2. What is the relationship between self-identified ethnicity and different assessment profiles of
72 undergraduate physiotherapy students?

73

74 **Methods**

75 A retrospective analysis was conducted of all marks awarded for academic and clinical modules
76 across all three levels of study for all physiotherapy students enrolled onto the BSc (Hons)
77 physiotherapy degree programme (both for the 3 year full-time route and the 4 year part-time
78 route) between 2005-2009 at one London University. These five cohorts covered the entire period
79 that this validated programme was delivered. Consequently, course content and assessment
80 processes were stable over the study period. For ease of data interpretation, results are presented in
81 years 1-3 as this relates to the level of learning for both the full and part-time students.

82

83 A database was compiled by two of the researchers (AW, MN) using data for each academic and
84 clinical module across each year of the physiotherapy degree programme and including final course
85 achievement (course completed, intermediary award, course failure academic and other). A third
86 researcher (SN) independently checked data for accuracy.

87

88 Demographic variables were entered as follows: age at time of entry to the programme (mature \geq 21
89 years, standard entry $<$ 21 years), self-identified gender and mode of study (full-time 3 year route or

90 part-time 4 year route). Self-identified ethnicity was categorised into white British, Asian, Black and
91 Other. The categories of ethnicity were used as they are recognised as widely representative within
92 other published literature [23]. Further sub-divisions were not statistically feasible given limited
93 numbers. These demographic details were considered important as previous studies have suggested
94 they may influence outcome [24, 21, 17]. A further classification of socioeconomic status was
95 sought, as research in education more widely has indicated a relationship between socioeconomic
96 background and success on academic courses at undergraduate level [25]. Such data was not
97 accessible through University records. Data for the POLAR2 quintile [26], which is an approximation
98 of education participation and widely used in widening participation studies, was therefore used as a
99 proxy for social demographics. The POLAR2 classification is based on permanent address postcodes
100 and comprises five categories ordered from 1 (wards with the lowest participation in higher
101 education) to 5 (wards with the highest participation). To maximise statistical power, these quintiles
102 were grouped in a binary fashion with groups 1 and 2 representing 'low participation' (equivalent to
103 the lowest 40% participating in higher education) and groups 3-5 representing 'high participation'.
104 All demographic data was verified through official student records. Students with missing data were
105 removed from the database.

106

107 This study was considered by the School of Health Sciences and Social Care Research Ethics
108 Committee who deemed research ethics approval unnecessary as the data utilised was routine,
109 previously collected and anonymised. The compiled data was held on password protected
110 computers accessible only to the research team.

111

112

113

114 **Analysis**

115 Chi squared, Fisher's exact test or one way ANOVA were used to determine whether there was a
116 bivariate association between socio-demographic characteristics (gender, age, mode of study,
117 ethnicity and educational participation) and outcomes.

118

119 The relationship between physiotherapy degree (physiotherapy degree versus no physiotherapy
120 degree) and ethnicity was investigated with a logistic regression model. Multiple linear regression
121 was used to model the relationship between scores (marks as percentages) on individual modules
122 and ethnicity. All models controlled for age group at entry, gender, mode of entry (full or part time)
123 and educational participation. All analyses were carried out using Stata version 12 (StataCorp, 2011).

124

125 **Results**

126 **Descriptive Data**

127 The data from 461 students were included in the database. 13 students were removed due to
128 missing ethnicity data. As summarised in table 1, 298 (67%) participants were under 21 years, 390
129 (87%) studied on a full time route, 307 (69%) students were female and 129 (29%) students
130 described their ethnicity as from Black Minority Ethnic (BME) background. Of those, the largest sub-
131 category was Asian (58, 45%) followed by Other (43, 33%) and Black (28, 22%). Measures of
132 educational participation (POLAR2 quintile) revealed only 27 students (6%) in a low educational
133 participation category (POLAR 2 groups 1 & 2).

134 (Table 1)

135

136 A number of significant associations were observed between the ethnicity subgroups (Table 1).
137 Notably, Asian students had a significantly greater percentage of students aged under 21 (76%,
138 $p=0.005$) and studying on a full-time route (97%, $p<0.001$) compared with other ethnicities. The
139 Other ethnic background consisted of 81% females, higher than white British, Asian and Black (71%,
140 53%, and 54% respectively, $p=0.004$). There was no statistically significant difference in the number
141 of students from a low educational participation category between ethnicities.

142

143 **Multifactorial analysis**

144 On investigating degree success, striking differences were demonstrated between ethnic categories
145 (table 2). Students from Asian backgrounds had decreased odds of succeeding compared with white
146 students (OR 0.43 95%CI 0.24, 0.79 $p=0.006$), as had Black students (OR 0.42 95%CI 0.19, 0.95
147 $p=0.036$) and students from other ethnic backgrounds (OR 0.41 95%CI 0.20, 0.87 $p=0.020$).

148

149 These differences are also apparent when considering success across years, when modules are
150 categorised as either academic or clinical and through mode of assessment (written or practical
151 examination). For example students from Asian backgrounds, on average scored significantly lower
152 than their white British peers across all years. However, the effect size is greatest at level one (-7.58
153 95% CI-12.66, -2.50). This contrasts with the students from Black backgrounds who had a more even
154 profile across the course and the students categorised as Other ethnic background whose score was
155 significantly lower than white British students at level three (-3.02, 95% CI -5.70, -0.34).

156 Furthermore, students from Asian backgrounds on average achieve 6.06% (95% CI -8.33, -0.78)
157 lower marks than white students on modules assessed practically and in contrast to those assessed
158 through written work (-1.44, 95% CI -3.40, 0.53). While students from Black backgrounds on average

159 scored lower in practical assessments (-5.13, 95% CI -8.22, -2.04), their average score in clinical
160 assessments was on average 6.93% (95% CI -9.92, -3.95) lower than white students.

161

162 (Table 2)

163

164 When considering specific modular results a number of associations can be noted (Table 3). The
165 students from Asian backgrounds were awarded statistically lower scores in 11 of 16 modules. Of
166 these, three showed an average difference of over 10 percentage points. All of these (modules 3, 4
167 and 6) are practical exams conducted within the University. This relationship was in part followed by
168 students from Black backgrounds who illustrated statistical different lower marks in nine modules.
169 Like the students from Asian background, they also demonstrated lower marks with a large effect
170 size in module 4. However they were also scored lower in module 15, which is the last clinical
171 placement prior to graduation.

172

173 (Table 3)

174

175 **Discussion**

176 The primary finding of this research is a large discrepancy in degree attainment between the white
177 British and BME students. It is notable that the poorer attainment of a physiotherapy degree across
178 the BME groups persisted across the three subcategories and remained stable when controlled for
179 known variables of influence – age, gender, mode of study and participation. Several research
180 studies have considered the discrepancy between the achievement of first degree between white
181 British and BME students. Whilst much of this literature considers attainment of degree by degree
182 classification, the pattern of attainment parallels that in this study. Connor, La Valle, Tackey and

183 Perryman [24] for example reported a survey considering two groups of 136 students (one BME
184 group, one white British group) graduating from four British HEIs, matched for key variables. 65% of
185 white British students were awarded 'good' degrees, with a corresponding figure of 34% for BME
186 students. Similar findings were reported by other research groups [27, 28, 25, 29, 30, 31]. These
187 researchers all reported that in general white British students are not only more likely to obtain
188 good degrees than students from other ethnic groups, but they are more likely to obtain a first-class
189 honours degree.

190

191 In addition to the differences in degree attainment, this study highlighted some heterogeneity
192 between the different minority ethnic groups. Of specific note is the difference between practical
193 and written assessments for the students from Asian backgrounds and in part the students from
194 Black backgrounds. This finding is paralleled in medical education literature. Yates and James [21] for
195 example reported non-white ethnicity to be a risk factor associated more strongly with lower marks
196 on the clinical course as compared to written assignments. However, a lack of specific data in this
197 paper limits extrapolation of these findings. Likewise Stegers-Jager et al [19] noted that students
198 from BME backgrounds performed less well than their white peers in assessed clinical performance.
199 Within physiotherapy literature, studies in the USA have indicated differences on clinical placement
200 scores based on ethnicity [15]. Others demonstrate a more universal disadvantage based on
201 ethnicity [16], which would perhaps mirror more closely the experience of the students of Black
202 backgrounds in this study, a pattern reported in other literature considering academic performance
203 within Higher Education [25].

204

205 Descriptive data from this current study demonstrated a high percentage of students from minority
206 ethnic backgrounds and younger cohorts as compared with national figures. The very low

207 representation of undergraduate students from low educational participation backgrounds is of
208 note. While comparable data is not available nationally, a trend for physiotherapy to be dominated
209 by those from the middle classes is noted historically [32], suggesting a continuation of social bias in
210 people seeking to qualify as a physiotherapist. This pattern is reflected in medicine, with calls to
211 consider the social and cultural factors which may problematically limit access to the profession [33].

212

213 The results from this retrospective analysis of results cannot fully unpick the reasons for the
214 difference in the marks awarded. Other studies suggest some areas and it is likely that the observed
215 differences result from a complex interaction of a number of factors. Mason and Sparkes [34] discuss
216 multiple potential factors which may limit the success of students from BME backgrounds within
217 physiotherapy. In their view, lecturers may lack cultural competence and course content may lack
218 cultural equivalence. Ridley [35] further argued that the type of learning undertaken by students
219 may also be associated with poorer outcome and reported that superficial learning was favoured by
220 students from Black backgrounds. Other suggestions that may account for the differences reported
221 in this and other studies include considerations of students' other working commitments and related
222 time, social and economic pressures, the potential for and impact of low expectations by staff, low
223 parental education, limited numbers of staff from BME backgrounds and a lack in transparency in
224 moderation processes [31]. Quality of prior educational attainment has also been suggested [21, 24].
225 Specifically within physiotherapy Haskins et al [14] in the USA identified the potential for covert
226 examiner bias in clinical assessments based on ethnicity, a finding supported by a study of Dutch
227 medical student performance and qualitative studies of medical students and their educators in the
228 UK [18,20]. These studies may offer some explanation for the difference in practical and written
229 assessments reported in the present study, although clearly this area needs further investigation.

230

231 While the studies cited may suggest possible explanations for findings of this current study, they are
232 both limited in rigour and direct relevance to an undergraduate physiotherapy course in the UK
233 context. Consequently, given the data presented in this study, there is a need to validate the findings
234 through further robust examination of assessment results and ethnicity, and to explore the specific
235 reasons within the undergraduate physiotherapy programme for the discrepancies reported here in
236 order to develop tools and strategies to maximise chances of success for all students.

237

238 **Limitations**

239 There are notable limitations with the data used in this study and subsequently the interpretation of
240 results. A rigorous data inputting and checking process was undertaken with only validated marks
241 and socio-demographic data utilised. However, we do acknowledge that the categorisation of both
242 the POLAR2 quintile and ethnicity results in potential loss of heterogeneity within the categories, a
243 heterogeneity which has significance in education [36]. Also, whilst accepting that the POLAR2
244 quintile is used by HEFCE [26] as a proxy for socioeconomic status, as a crude measure of
245 participation it does not accurately reflect the socioeconomic position of individual students. It is
246 possible therefore that the effect of ethnicity has been inflated within this study.

247

248 It is also recognised that previous academic performance of students was not included within the
249 modelling process. Previous educational achievement is considered in other literature as an
250 influencing factor on degree success and performance at University [21, 24]. However, on this
251 particular degree course, admission includes very high academic requirements and subsequently
252 disparity between students is limited. Furthermore multiple variables were included in the model
253 which strengthens the study.

254

255 **Conclusion**

256 This analysis of five cohorts of undergraduate physiotherapy students illustrated a persistent
257 difference in attainment between students from white British and those from BME backgrounds.
258 Heterogeneity within and between minority ethnic groups was illustrated. This study reinforces the
259 need to consider ethnicity within physiotherapy education. The data presented in this study raises
260 further questions about the consistently poorer performance in physiotherapy students from a BME
261 group in comparison to white British students.

262

263 **Implications for future research**

264 This study calls for two further strands of research. Firstly, a broad examination of success in
265 physiotherapy undergraduate courses and ethnicity at national level. Such an exploration would
266 require the development of a robust and transparent reporting tool that included additional student
267 demographic data, specifically that pertaining to socioeconomic status. Secondly, there is a critical
268 need to explore why such differences occur and to further examine the heterogeneity within ethnic
269 groups. Echoing calls from a previous study [13] such exploration is essential if student success is to
270 be maximised.

271

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275

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281 *Conflict of interest*: None declared

282

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370

371 Table 1 Characteristics of physiotherapy students by ethnicity grouping

Variable	White British		Asian		Black		Other		p-value
	n/N or mean	% or (SD)	n/N or mean	% or (SD)	n/N or mean	% or (SD)	n/N or mean	% or (SD)	
Under 21	218/319	68	44/58	76	17/28	61	19/43	44	0.005
Full time	282/319	88	56/58	97	22/28	79	30/43	70	<0.001
Female	226/319	71	31/58	53	15/28	54	35/43	81	0.004
Low educational participation	24/305	8	2/56	4	1/28	4	0/34	0	0.267

372

373 Table 2 – Degree award and academic achievement by minority ethnic group at year level and module type
 374 controlling for age group at entry, gender, mode of entry and social participation group

	Asian			Black			Other		
	Coefficient	95% CI	p-value	Coefficient	95% CI	p-value	Coefficient	95% CI	p-

									value
Physio degree**	0.43	(0.24, 0.79)	0.006*	0.42	(0.19, 0.95)	0.036*	0.41	(0.20, 0.87)	0.020*
Year 1 average	-10.00	(-13.63, -6.36)	<0.001*	-7.58	(-12.66, -2.50)	0.004*	-4.63	(-9.35, 0.09)	0.054
Year 2 average	-6.21	(-8.31, -4.11)	<0.001*	-4.32	(-7.07, -1.58)	0.002*	-0.15	(-2.83, 2.54)	0.915
Year 3 average	-2.14	(-4.29, 0.00)	0.050*	-6.28	(-9.24, -3.33)	<0.001*	-3.02	(-5.70, -0.34)	0.027*
Academic modules	-4.67	(-6.79, -2.54)	<0.001*	-3.46	(-6.39, -0.53)	0.021*	-1.55	(-4.21, 1.11)	0.252
Clinical modules	-3.59	(-5.78, -1.39)	0.001*	-6.93	(-9.92, -3.95)	<0.001*	-1.91	(-4.62, 0.79)	0.165
Written modules	-1.44	(-3.40, 0.53)	0.152	-3.01	(-5.71, -0.30)	0.026*	-2.04	(-4.50, 0.42)	0.103
Practical modules	-6.06	(-8.33, -3.78)	<0.001*	-5.13	(-8.22, -2.04)	0.001*	-1.44	(-4.24, 1.37)	0.314

375 *statistically significant at 0.05

376 **Odds ratio

377 Reference category is white British

378

379 Table 3 – Module marks by minority ethnic groups controlling for age group at entry, gender, mode of entry

380 and social participation group.

381

	Asian			Black			Other		
	Coefficient	95% CI	p-value	Coefficient	95% CI	p-value	Coefficient	95% CI	p-value
Module 1	-9.09	(-13.43, -4.76)	<0.001*	-9.25	(-15.08, -3.42)	0.002*	-6.06	(-11.46, -0.67)	0.028*
Module 2	-1.96	(-4.96, 1.05)	0.201	-6.93	(-11.14, -2.72)	0.001*	0.17	(-3.80, 4.15)	0.931
Module 3	-14.89	(-20.75, -9.03)	<0.001*	-9.51	(-17.70, -1.32)	0.023*	-3.53	(-11.14, 4.08)	0.361

		-9.03)			-1.31)			4.07)	
Module 4	-15.82	(-21.92, -9.72)	<0.001*	-11.69	(-20.19, -3.19)	0.007*	-9.27	(-16.87, -1.66)	0.017*
Module 5	-6.93	(-11.02, -2.84)	0.001*	-2.90	(-8.51, 2.72)	0.311	-5.29	(-10.60, 0.01)	0.050*
Module 6	-11.82	(-15.77, -7.88)	<0.001*	-6.33	(-11.61, -1.05)	0.019*	0.25	(-4.92, 5.42)	0.925
Module 7	-4.55	(-8.08, -1.02)	0.012*	-3.12	(-7.80, 1.56)	0.190	-4.68	(-9.22, -0.14)	0.043*
Module 8	-6.47	(-9.08, -3.85)	<0.001*	-3.07	(-6.45, 0.32)	0.076	-2.11	(-5.47, 1.26)	0.219
Module 9	-7.85	(-11.12, -4.58)	<0.001*	-7.29	(-11.67, -2.91)	0.001*	-0.11	(-4.40, 4.17)	0.959
Module 10	-3.15	(-6.22, -0.07)	0.045*	-1.90	(-6.01, 2.22)	0.365	1.29	(-2.74, 5.32)	0.529
Module 11	-9.01	(-12.92, -5.09)	<0.001*	-3.95	(-9.13, 1.23)	0.134	2.74	(-2.33, 7.81)	0.288
Module 12	1.08	(-2.00, 4.15)	0.491	-2.79	(-6.92, 1.34)	0.185	-3.67	(-7.51, 0.17)	0.061
Module 13	-1.92	(-5.19, 1.33)	0.246	-7.07	(-11.57, -2.57)	0.002*	0.60	(-3.48, 4.67)	0.774
Module 14	-4.14	(-7.48, -0.81)	0.015*	-7.11	(-11.71, -2.52)	0.003*	-2.01	(-6.17, 2.16)	0.343
Module 15	-3.37	(-7.76, 1.03)	0.133	-11.88	(-17.93, -5.82)	<0.001*	-5.50	(-10.99, -0.01)	0.050*
Module 16	-2.39	(-6.19, 1.42)	0.218	-2.58	(-7.82, 2.66)	0.333	-4.54	(-9.29, 0.21)	0.061

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383 *statistically significant at p<0.05

384 Reference category is white British

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