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Admission interview scores are associated with clinical performance in an undergraduate physiotherapy course: an observational study

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Abstract

Objective The purpose of this study was to determine if there is an association between admission interview score and subsequent academic and clinical performance, in a four-year undergraduate physiotherapy course.
Design Retrospective observational study.
Participants 141 physiotherapy students enrolled in two entry year groups.
Outcome measures Individual student performance in all course units, practical examinations, clinical placements as well as year level and overall Grade Point Average. Predictor variables included admission interview scores, admission academic scores and demographic data (gender, age and entry level).
Results Interview score demonstrated a significant association with performance in three of six clinical placements through the course. This association was stronger than for any other admission criterion although effect sizes were small to moderate. Further, it was the only admission score to have a significant association with overall Clinical Grade Point Average for the two year groups analysed ($r = 0.322$). By contrast, academic scores on entry showed significant associations with all year level Grade Point Averages except Year 4, the clinical year.
Conclusions This is the first study to review the predictive validity of an admission interview for entry into a physiotherapy course in Australia. The results show that performance in this admission interview is associated with overall performance in clinical placements through the course, while academic admission scoring is not. These findings suggest that there is a role for both academic and non-academic selection processes for entry into physiotherapy.

Keywords: Admission criteria; Physiotherapy education

Introduction

The admission interview is one component of the entry process for selection into a range of health professional courses. Its primary purpose is to assess the non-cognitive or personal qualities of each applicant, although there is debate in the literature as to the most suitable qualities to assess [1–4]. The process of selection of candidates for health courses is ideally linked to the potential for candidates to achieve the graduate attributes desired by the universities and/or the professions. Kay *et al.* reviewed dental literature to determine which attributes to assess in developing an admission interview for a new dental school in the UK [5]. They differentiated between which of the desirable attributes of a dentist were innate and which were capable of being taught and determined that review of innate qualities should be the focus of the admission interview. The innate attributes then assessed at interview, included communication,

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sensitivity, judgement and analysis, management of people, conscientiousness, professionalism, reflectiveness and ethical behaviour.

The admission interview is widely utilised for admission into medical schools both in Australia and internationally, with growing agreement amongst stakeholders that applicants should not be chosen on academic performance alone [4,6–8]. Interviews are conducted less frequently for admission to physiotherapy and allied health courses. However, it has been suggested that a balanced approach to physiotherapy admissions should address both academic record as well as qualitative factors including attitude, motivation and communication skills [9].

A 2010 overview of the selection processes for the 17 universities that offer physiotherapy programs in Australia, revealed The University of Notre Dame Australia (Notre Dame) to be one of only two universities to utilise an admission interview for entry into an undergraduate physiotherapy program [10]. The School of Physiotherapy at Notre Dame has been interviewing its applicants since the program's inception in 2003. Since 2006, the program has adopted a semi-structured admission interview format, with the interview score contributing 50% towards the overall application score, following academic screening. The interview explores personal attributes in areas of achievement, challenges, motivation, problem-solving and communication.

The aim of this study was to explore relationships between the interview score on the physiotherapy admission interview at Notre Dame and subsequent performance during the course. Demographic variables were also considered as previous studies for the medical school population noted gender disparity with females outperforming males throughout course [7,11].

The primary research question for this study was: What is the predictive validity of admission interviews for selection into the School of Physiotherapy at Notre Dame?

Specifically, the following questions were addressed:

1. Is there a relationship between the Notre Dame physiotherapy admission interview and academic performance through the course?
2. Is there a relationship between the Notre Dame physiotherapy admission interview and clinical performance through the course?
3. What is the influence of gender and age on performance through the course?

This is the first study to review the predictive validity of an admission interview for the undergraduate physiotherapy population in Australia. The Consensus statement from the 2010 Ottawa Conference reported a lack of evidence from selection processes for health care professions outside medicine [12]. Findings will assist physiotherapy programs considering an admission interview in their entry process.

Method

A retrospective observational study was designed to investigate the relationship of admission scores and demographic data with subsequent performance through the Notre Dame physiotherapy program.

Participants

Physiotherapy students enrolled in their first year of study at Notre Dame in 2006 and 2007 were included in the study ($n = 152$). Students who deferred their start or failed to complete a unit or year (including taking a leave of absence) were included. The exclusion criteria were students who withdrew in their first year of study prior to completing any first year examinations ($n = 3$); students interviewed prior to 2005, when the interview structure was considerably different ($n = 1$); and students for whom no interview score was recorded due to no paper record of their interview being kept past graduation ($n = 7$). Consequently, 141 physiotherapy students from two year groups were included in the study.

Predictor variables

The predictor variables for the study included admission scores and demographic data. The admission scores were Interview Score, Tertiary Entrance Rank and Educational Score. The Tertiary Entrance Rank was the entrance score utilised for university selection in Western Australia prior to 2009. Similar to the current Australian Tertiary Admission Rank, the Tertiary Entrance Rank was a ranking system based on each student's performance relative to other students of school leaving age. The Educational Score was calculated by the School of Physiotherapy and provided a common entry measure for both school leavers and mature age applicants. For school leavers it was determined from the Tertiary Entrance Rank and for mature age applicants, it was determined from the Mature Age Rank based on undergraduate performance in previously completed or partially completed undergraduate study. Demographic data included as predictor variables were: gender; age on entry; and entry level which was recorded as either mature age or school leaver.

Outcome variables

Outcome variables included individual student results for year level and overall Grade Point Average, individual clinical placement results and overall Clinical Grade Point Average, individual unit scores and Objective Structured Clinical Examinations (OSCEs) results. In the case that a student repeated a unit, the first result was utilised. In total there were 54 outcome variables incorporating all aspects of performance through the undergraduate program.

Data analysis

Following linkage of admission data with course results, data were de-identified for correlation and linear regression analysis by cohort and overall. Data were analysed in IBM® SPSS® Statistics 20. A *p*-value of 0.05 was selected as the criterion for statistical significance.

Descriptive statistics were applied to the demographic data and admission scores. The mean, standard deviation and range were determined for the predictor variables of Interview Score, Educational Score, Tertiary Entrance Rank and age. Differences between cohorts were examined with a comparison of means conducted with a one-way ANOVA. Attrition rates per year group were also noted with demographic data analysed for the attrition subgroup.

Scatterplots explored relationships in the data with respect to linearity, slope and direction of any relationship and any clustering or evidence of outliers. Due to the ceiling effect observed in the Educational Score, Spearman's rank correlation coefficients were calculated for Educational Score versus each outcome variable. Due to the linear nature of the data, Pearson correlation coefficients were calculated for Interview Score, Tertiary Entrance Rank and age versus each outcome variable. Point biserial correlations were performed for the dichotomous variables of entry level and gender versus each outcome variable. Significance (2-tailed) was recorded for each correlation coefficient as a *p*-value.

Cohen's effect sizes were utilised as a guide for reporting the strength of associations [13]. Cohen's effect sizes are commonly reported in the admissions literature [7,14] with 0.10 reported to be a 'small' effect, 0.30 a 'moderate' effect and 0.50 or greater a 'large' effect.

Preliminary analyses showed that entry level and age produced similar correlation outcomes so entry level was not included as a predictor variable in the linear regression modelling. Similarly, only one academic admission score was included in the linear regression modelling, being the Educational Score, as this was the common academic predictor variable across both entry level groups. Multiple linear regression modelling, using the Enter method, was applied for the four predictor variables of Interview Score, Educational Score, age and female gender against each outcome variable. Standardised coefficients (Beta) were recorded for each predictor variable as well as the corresponding *p*-values. The adjusted R square was recorded as the percentage of variance accounted for by each model.

Results

Descriptive analysis

The mean age of physiotherapy students on enrolment, for both year groups combined, was 19.6 (standard deviation 4.2; range 17 to 40). 66% of participants were females and 62% were school leavers. Table 1 presents the admission scores per year group and overall, including the mean, standard deviation and range. The mean Educational Score for entry was lower in 2006, although correspondingly, the mean Interview Score was higher for that intake. Of the 141 students included in the study, 26 failed to complete the physiotherapy course, 19 of those students commencing in the 2006 cohort. This represented 24% of the entry year group, compared with 10% of the 2007 year group. Of the students who failed to complete the course, 18 (69%) were school leavers and 16 (62%) were female. Mean Educational Scores and Interview Scores for students who failed to complete the course are presented in Table 2 along with a comparison of means between the groups. Students who failed to complete the course had a mean Interview Score 3 points lower than students who graduated.

Table 1
Tertiary Entrance Rank (TER), Educational Scores[a] and Interview Scores[b] per cohort and overall.

	2006Cohort	2007Cohort	BothCohorts
Mean TER (SD)	91 (4)	92 (4)	91 (4)
TER range	81 to 97	84 to 99	81 to 97
Mean educational score (SD)	29 (12)	32 (10)	30 (11)
Educational score range	10 to 40	10 to 40	10 to 40
Mean interview score (SD)	41 (6)	40 (6)	41 (6)
Interview score range	24 to 50	27 to 50	24 to 50

Note: SD = standard deviation;
[a] Maximum score = 40;
[b] Maximum score = 50.

Academic performance

The Interview Score had a significant association with performance in three of eight first year units, four of eight second year units and no third year individual units. Effect sizes (equivalent to the correlation coefficient) were small to moderate, with Pearson's *r* ranging from 0.196 to 0.342. This was in comparison to Educational Score which demonstrated a significant association with all but one unit in each of first

Table 2
Mean educational scores and interview scores per course completion.

	Mean educational score	Mean interview score
Course complete ($n = 115$) (SD)	31 (11)	41 (5)
Failure to complete ($n = 26$) (SD)	29 (11)	38 (7)
Significance level (p) for comparison of means	0.3	0.04

and second year; and all units in third year (Spearman's ρ range 0.190 to 0.432). Consequently correlations between year level Grade Point Average for the first three years and Educational Score were significant with moderate effect sizes (Spearman's ρ range 0.355 to 0.411) (Supplementary Online Table S1). The explained variance for the linear modelling for year level Grade Point Average decreased from first year (22%) to final year (7%). Educational Score significantly contributed to the model for all year level Grade Point Averages, except the Year 4 clinical year, for which Interview Score was significant.

Clinical performance

Interview Score demonstrated a significant relationship with performance in half of the clinical placements throughout the course, more than for any other admission criterion, although effect sizes were small to moderate (Pearson's r range 0.244 to 0.322) (Supplementary Online Table S1). Academic admission scores demonstrated a significant relationship with only one clinical placement, Year 4 musculo-skeletal. Interview Score was the only variable to reach significance in the overall Clinical Grade Point Average linear modelling (Supplementary Online Table S2).

The explained variance for linear modelling for OSCEs was very low with Interview Score contributing significantly to only one first-year OSCE ($R^2 = 3\%$) and one second-year OSCE ($R^2 = 7\%$). An interesting finding was the contribution of the academic entry score to all four musculo-skeletal OSCEs across two year levels of the course (R^2 range 3% to 9%).

Influence of age and gender

Females performed at a higher level throughout many units in course particularly from second year onwards. This was reflected in correlations between being female and year level grade point average in second, third and fourth year as well as overall grade point average (point biserial correlation r_{pb} range 0.208 to 0.291). Mature age applicants outperformed school leavers in first year but this trend was reversed later in the course with school leavers showing improved performance comparative to mature age students in three third year units (point biserial correlation r_{pb} range 0.196 to 0.241).

Discussion

This study provides evidence for the inclusion of both academic and non-academic selection measures for entry into physiotherapy. Academic and non-academic admission scores appear to have relationships with different aspects of the degree course, confirming that a balanced approach to admissions is worthwhile in the selection process.

As the literature suggests, potential students should be provided with the opportunity to demonstrate strengths outside of academic scores [4,6,7,15]. Students who entered with lower academic admission scores were no more likely than others to withdraw from the course. Several applicants were, however, accepted into the course with Interview Scores of 50% or below. Trice and Foster [16] recommend a minimum cut-off for admission interviews, similar to a minimum academic requirement. This may be worthy of consideration as those applicants who went on to withdraw from the physiotherapy course, scored on average 3 points less on their admission interview than those who completed the course. This was a significant difference which supports the view that the admission interview is a useful tool to address attrition rates, as reported in the literature [16,17].

Interview Score had significant correlations with three of six clinical placements compared with academic admission scores for which a significant correlation was only attained with the Year 4 Musculo-skeletal placement (Supplementary Online Table S1). However, caution should be taken when interpreting the results, as the effect sizes of the correlations were small to moderate.

Of interest, the Educational Score was significant in the regression models for the four musculoskeletal units as well as all four musculoskeletal OSCEs. This link between academic performance and the musculoskeletal stream has not been reported in the literature to date.

Females outperformed males in Years 2, 3 and 4 of the physiotherapy course, with no significant predictive relationship between males and any unit or year level Grade Point Average. This concurs with the medical school population, with studies in both Australia and the UK noting this gender disparity [7,11]. Similar findings were noted by Hammond in his analysis of three consecutive cohorts of physiotherapy students in the UK [18]. Females outperformed males in clinical placement results, with 13% of males failing a placement compared with only 2% of females. Hammond hypothesised that males may enter the physiotherapy course with unrealistic expectations regarding the reality of the profession, including the range of clinical areas studied.

Mature age applicants outperformed school leavers in the majority of first year physiotherapy-specific units. There may be several contributing factors to this finding. Mature age students frequently come from a health sciences background with exemptions for several first year subjects, thus lightening their workload. Further, contributing knowledge from associated courses may advantage mature age students in assessment items. Life experience and maturity of older applicants may also assist transition into university and resultant first year performance. This trend was reversed in later years of the course, with school leavers outperforming mature age students.

Limitations of this study include the inability to analyse components of the Interview Score due to inconsistency of records kept prior to 2007. Improved record keeping from 2007 will allow a review of the components of the Interview Score including the domains of communication and

motivation. An additional limitation was the ceiling effect evident in the Educational Score. This restriction of range at the upper end of scores is also reported in the medical school literature [7,19,20]. This should be considered when interpreting the results, in case of Type I error, although the cross correlation between Educational Score and Tertiary Entrance Rank gives confidence in the use of the Educational Score as an input into the analysis. Further, it was outside the scope of this study to analyse attrition data, including individual reasons for withdrawal from course.

The literature reports a close link between predictive validity and reliability of admission interviews, with highly structured interview processes demonstrating improved predictive validity [11,21]. Thus considerations for ensuring the reliability of interview processes must go hand in hand with evaluating the long-term effects or outcomes of the admission interview. Recommendations that are applicable to institutions currently interviewing or considering an interview process include: formalised annual interviewer training; feedback to staff on mean and range of interview scores following interview rounds; and interviewing 'blind' with no prior knowledge of applicant's academic scoring, following initial academic screening.

In conclusion, although the study findings are specific to the School of Physiotherapy at The University of Notre Dame Australia, it is envisaged that this study will assist other institutions either considering the implementation of an admission interview, or reviewing the utility and reliability of their current interview. Interview score demonstrated a significant association with performance in clinical placements. Although effect sizes were small to moderate, this association was stronger than for any other admission criterion highlighting the role of non-academic admission measures in the selection of physiotherapy students.

Ethical approval: Ethics approval was gained for this study from the Human Research Ethics Committees of The University of Notre Dame Australia (011019F) and The University of Western Australia (RA/4/1/4637).

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Conflict of interest: None declared.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.physio.2014.03.002.

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