CoRIPS Research Award 075
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The influence of clinical placement setting on academic achievement within an undergraduate diagnostic radiography programme

Lay Summary:
Radiography education programmes in the UK are a synergy of academic and clinical learning with practice based learning within clinical settings forming a substantial part of undergraduate degree courses (CoR, 2011). These placements are evaluated by the Health Professions Council (HPC, 2011) and accredited by the College of Radiographers (CoR, 2005) to ensure suitability to support learning through an appropriate range and volume of examinations; access to appropriate equipment; availability of staff to support learning; and effective liaison arrangements with the HEI are in place. However the College of Radiographers (2011; 2004) have suggested that there is evidence of variability in working culture, staff attitude towards students, and teaching abilities between clinical placements. These factors may have a significant impact on student experience and learning and while previous studies have considered student experience and placement satisfaction, no identified study has considered the impact of clinical placement on academic achievement within the context of varying student radiographer demographics.

This study will consider the academic performance of 6 cohorts of diagnostic radiography undergraduate students at one UK Higher Education Institution (HEI) where students are allocated to a single Hospital Trust for the majority of their practice placement. Clinical placement, age, sex, highest academic award and ethnicity will be examined independently and in combination to determine their influence on academic achievement. This knowledge will provide a valuable new insight into the impact of clinical placement on learning within a radiography degree programme and enhance our understanding of experiential equity across different demographic groups.

Principle Aim of the Study
To determine if substantive clinical placement and demographic factors are influential in determining academic achievement within an undergraduate diagnostic radiography programme.

Primary research question
Does the substantive clinical placement explain the variations in student academic achievement and progression when demographic factors are controlled for in an analytical model?

Secondary research questions

- Is the substantive clinical placement a factor in determining student academic achievement and progression when considered independently?

- Is ethnicity a factor in determining student academic achievement and progression when considered independently or in combination with other factors within an analytical model?

- Is age at start of programme a factor in determining student academic achievement and progression when considered independently or in combination with other factors within an analytical model?

- Is gender a factor in determining student academic achievement and progression when considered independently or in combination with other factors within an analytical model?

- Is highest academic award at the start of the programme a factor in determining student academic achievement and progression when considered independently or in combination with other factors within an analytical model?

- Is declared disability a factor in determining student academic achievement and progression when considered independently or in combination with other factors within an analytical model?

- Is travelling distance from term time residence to main clinical placement a factor in determining student academic achievement and progression when considered independently or in combination with other factors within an analytical model?

Outcomes
The primary outcome is to determine whether substantive clinical placement site influences student academic achievement within a 3 year undergraduate diagnostic radiography degree programme within a single HEI when academic and non-academic variables (age, sex, declared disability, highest academic award, travelling distance to clinical placement and ethnicity) are controlled for. This will be the first study to objectively measure how these factors interact to influence student academic achievement and will provide crucial information as to how the clinical learning environment impacts on academic success whilst controlling for academic and non-academic variables which have been highlighted in previous studies as influential to academic achievement (Ali & Naylor, 2010; McCarey et al, 2007).

Review of the literature and identification of current gap in knowledge
The clinical practicum is a fundamental component of the undergraduate radiography course and learning that takes place in the clinical environment is crucial to enable students to develop professional skills and integrate theory and practice (CoR, 2011). While clinical placement learning is an integral component of all radiography programmes across the UK, the College of Radiographers suggests that the culture, staff attitude and teaching abilities vary between clinical departments (CoR, 2011; CoR, 2004). Consequently, assuring "equity of the student experience in practice education" as advocated by the College of Radiographers (CoR, 2005) becomes a difficult, if not impossible, task (Tanda &Denham, 2009; CoR, 2004).

Clinical placements present students with a very different learning environment to that found within the academic classroom (Brown et al, 2011; Makarem et al, 2001). It is suggested that environments that support staff development and encourage independent thinking are most able to foster quality learning (Henderson et al, 2011; Chan, 2002). Pryjmachuk et al (2009) support this belief and identified variation in the level of student nurse attrition across different healthcare organisations, suggesting that organisational issues impacted on student nurse attrition. However, they also acknowledged a paucity in the literature with regard to healthcare organisational influences on nurse education and the need for further work to identify specific influential factors.

Studies that have attempted to evaluate the clinical learning environment have focussed predominantly on the perceptions of the student (McCall et al, 2009; Papp et al, 2003). However, Midgely (2006) suggests that a link between student perceptions of a good learning environment and an increase in academic achievement cannot be assumed and raises doubts as to the validity of student feedback in determining the quality of clinical placement. Similarly, Makarem et al (2001) state that "student evaluation of instruction ought not to be the sole vehicle for judging effectiveness of instruction" and Wheat and Currie (2005) suggest that the significance and impact of the clinical placement differs in each year of a course. As a result, student perceptions of clinical placement and its influence on learning and academic achievement are not consistent across programme years.

Some authors have emphasised the influence of demographic and academic variables on academic achievement within vocational education programmes (Ali & Naylor, 2010; Kwan et al, 2009) suggesting that these are important factors when assessing educational success. In particular, age, gender, preadmission qualifications and ethnicity have been demonstrated as influential factors (Mulholland et al, 2008). Published evidence also indicates that disability can influence learning (Kolanko, 2003) and a study by Murphy (2009) suggests that the number of radiography students with specific learning disabilities is likely to be increasing. Further compounding factors which were cited by Glossop (2001) as being influential causes of attrition, and therefore can be expected to also influence academic performance, include family or personal problems, ill health, and travel difficulties.

The present study aims to address the gap in current knowledge and provide an objective measure of the influence of substantive clinical placement on academic achievement whilst controlling for academic and non-academic variables known to influence performance. The trends of learning and achievement across a degree programme have not been considered within the field of radiography before and the proposed study will consider academic performance in each year of the course as well as final academic award to determine trends in progression across the demographic and placement groups.

Methodology

Design:

A retrospective, longitudinal cohort study to evaluate the impact of clinical placement and known academic and demographic factors on academic achievement. The demographic data to be used in this study is collected routinely by the HEI upon enrolment and data regarding academic achievement will be compiled from student records which are maintained by the department.

Literature Review:
A comprehensive and systematic review of the literature will be conducted into the subject area to inform the current project. Key terms will be identified which define the topic and combinations of these terms will be used to search in the following databases: Science Direct, CINAHL, Ingenta Connect and Medline. Search limitations will include publications in English language only and publications after 1991 when radiography education moved from diploma to Degree education. Inclusion criteria will be set and the reference list of all included articles will be examined. The search strategy will be reviewed after the initial searches are performed and adapted; key words which are identified within included articles will be considered for use in future searches. The searches will be saved and a detailed account of the search strategy employed will be recorded. Advice and assistance in undertaking the literary searches will be sought from an information specialist employed at the HEI (University of Bradford).

Sample:
A convenience sample of all the students who enrolled on the undergraduate radiography course at the University of Bradford between 2003 and 2008 will be used. The structure of the radiography course at the university changed significantly in 2003 and therefore data from the cohorts prior to this would not be comparable. Between these dates the radiography course has remained relatively stable with very few changes to the course structure, delivery methods or clinical practice learning. Consequently, the experiences of students in these cohorts should be similar allowing for comparison. Extending the study sample to include students from other HEI's would be unfeasible given the resources available and the purpose of this study is to determine whether the clinical placement setting influences academic achievements and therefore forms a baseline on which further research may be undertaken.

Radiology departments are fairly dynamic and this study proposes to review 6 cohorts of students spanning 8 years of clinical placement. Over this time period it is expected that there would be a number of staffing changes and occasional periods of staff shortages in each of the departments. However, the period of time is long enough that any transitory changes should not have a significant effect in the results of the study. At the same time, if a department has a persistent high staff turnover or a succession of prolonged periods of staff shortages then this may be pertinent to the study as factors that influence staff retention may also impact on student achievement.

Placement allocation at this HEI is randomly undertaken, although students may express a preference. This reduces the risk of data being skewed as a result of clustering (e.g. more academically able students or older students etc being consistently allocated to one clinical placement). In addition, as 6 cohorts of students will be included in the study it is unlikely that the same bias, if present, will be repeated in each consecutive year. However, as this cannot be assured prior to acquisition of the data, baseline qualifications across sites will be compared as part of the initial analysis strategy to determine any skewing of placement allocation in terms of baseline academic qualifications of assigned students. Furthermore, the final academic award will not be the sole outcome measure, academic progression across the 3 years of the course will also be analysed to establish trends in academic improvement.

Ethical Approval:
The project will use primary data collected from human subjects so the university ethics committee will be consulted and ethical approval sought. All data collected will be managed in accordance with the Data Protection Act (1998) and encryption and password protection will be employed for all electronic data. Confidentiality will be maintained and no student or clinical placement site will be named in any reports or publications.

Data Collection:
The data to be compiled includes demographic data obtained by the University from each student at the point of entry onto the course; the data includes age at course start date, gender, highest academic award, declared disability and ethnicity. Due to available resources and time constraints, retrospective data will be used. However, all the variables to be included in the analysis have been identified within the literature as being potentially influential on student achievement in health science education (Ali & Naylor, 2009; McCarey et al, 2007; Salamonson & Andrew, 2006).

Student academic records will be examined to enable the clinical placement each student attended to be identified and the aggregated mean mark for years 1, 2 and 3 of the course, as well as the final degree classification, to be collected. The distance to clinical placement will be calculated using the term time postcode of each student as provided in the first year of the course. This may have changed across the three year course and is an accepted limitation of the study. The data will be compiled by an administrative assistant and checks for missing data will be conducted and reported. All data will be aggregated to minimise the chance of bias and to ensure confidentiality.

Data Analysis:
The data will be analysed using SPSS 16 (statistics package for the social sciences). Methods of analysis will include descriptive statistics and the development of a random effects multiple logistic regression model. Multiple logistic regression is a suitable tool when there may be confounding variables and where nominal data is included (Campbell & Swinscow, 2009). A random effects model will be used because the data related to clinical placement is not independent as students allocated to the same placement may be considered as groups or clusters.

Both a stepwise and backward stepwise approach to model building is planned to confirm the influence of factors within the model although further advice on completing and interpreting the statistical analysis will be sought from a medical statistician to ensure that the methods adopted and data are appropriate for the desired outcomes and proposed analysis.

Potential impact of study
Whilst evidence suggests that the culture within the clinical setting is important to student learning, no study has provided empirical evidence of the impact of clinical placement setting on academic achievement across a 3 year programme of undergraduate study or calculated the magnitude of this effect. Without this fundamental knowledge, identifying the factors which positively impact on learning in practice settings and any adjustments necessary to promote equitable learning across demographic groups and clinical settings is impossible.

This study will take into account, and control for, all the factors highlighted in the literature as being potentially influential to student achievement with the exception of major life events and illness of students. Information regarding mitigating circumstances is confidential and not available to scrutiny and this may have to be an acknowledged limitation of the study. Nevertheless, while it is acknowledged that mitigating circumstances may skew the performance of individual students, this research considers amalgamated data from 6 student cohorts rather than individual student data. As a result, it is unlikely that the circumstances of an individual will unduly influence the overall study results for the amalgamated data. In addition, there is evidence within the psychology literature suggesting that a reaction and response to a specific life event is individual to the person involved and is a complex function of a number of factors (Eschleman et al, 2010). As a result, consistency of reaction and impact of any life event on learning cannot be assured and instead, we have to assume that all students during a 3 year programme of study will each experience a range of life events that may both positively and negatively influence their learning.

This study will provide baseline evidence regarding the link between clinical placement setting and academic outcome that may be used to inform future studies. There is the potential in the future to expand this work to consider students from other HEI's and look at potential differences between rotational and non-rotational clinical placement designs. Also the reasons for any differences found between clinical placements in this study could be explored at a later stage.

Dissemination strategy
The results of the study will be shared through a report to the participating HEI and clinical practice partners. The study will also be submitted for publication to a peer review publication. This is likely to be Radiography although a generic education journal may also be appropriate as it is anticipated that the learning from this study may be applied to other health professional groups. An abstract will also be submitted to UKRC.

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