

WHERE DO ALL THE UNDERGRADUATE AND NEW GRADUATE NURSES GO AND WHY? A SEARCH FOR EMPIRICAL RESEARCH EVIDENCE

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ABSTRACT

Objective:

To review the published scientific literature for studies quantifying or examining factors associated with the attrition of undergraduate nursing students in pre-registration programs and the retention of graduate nurses in the workforce.

Methods:

The following selection criteria were used to systematically search the literature: target populations were either students in pre-registration nursing programs or registered nurses in their graduate year; the studies were to be primary observational or analytical (cross-sectional, case-control or prospective cohort studies) in design; and outcome measures were attrition in undergraduate programs and/or retention of graduates within the workforce. Three authors guided by a standardised procedure performed data extraction and quality assessment independently. Synthesis of the data appears in text and tabular format. Due to the heterogenic nature of the study methods, meta-analysis was not possible.

Results:

This review found only four studies that met all inclusion criteria. All four studies examined undergraduate attrition as an outcome with two studies reporting a range of 25-27% attrition within the first year. No studies were found that quantified or examined retention of new graduates as an outcome measure. Only two of the four studies followed cohorts of students prospectively and were able to provide a high level of evidence, although each of these studies was designed to assess specific exposures as potential predictors of attrition, rather than assess actual factors associated with students leaving their program.

Conclusion:

There is a paucity of research studies in the literature from which evidence quantifying attrition and retention and the reasons why students leave undergraduate nursing programs or new graduates leave the profession can be obtained. Clearly there is a need to systematically track undergraduates and new graduates to quantify and understand attrition, retention and workforce choices within the nursing profession and begin to build this evidence-base.

INTRODUCTION

Current and future nursing workforce supplies are critically low and have been acknowledged internationally (CNA 2002; Crowley et al 2002; DEST 2002; ICN 2004; Crow et al 2005; RCN UK 2005). The International Council of Nurses launched the 'Global Nursing Workforce Project' in 2004 in response to the global nursing crisis (ICN 2004). Nurses comprise the largest health professional group and the overall effectiveness of any health care system depends on a viable nursing workforce (ICN 2004).

In the United States of America (USA), the nursing shortage is estimated to double from 6% in 2000 to 12% in 2010 (Crow et al 2005). Projected estimates in Canada predict a shortfall of 78,000 nurses by the year 2011, increasing to 113,000 nurses by 2016 (CNA 2002). In the United Kingdom (UK), quantifying projected shortages of the nursing workforce appears to be difficult to ascertain. A recent report from the Royal College of Nursing (RCN UK) states there are 'information gaps' and 'weaknesses' in the available data on the nursing labour market (RCN UK 2005 p.10). However, a current survey found that 62% of nursing managers found it difficult to fill vacancies, and current efforts by stakeholders to increase the workforce are not sufficient to meet nursing

workforce demands over the next ten years (RCN UK 2005). Within the Australian health care system, a 40,000 deficit nursing supply is predicted by the year 2010, and the supply of nursing graduates over recent years, as well as future estimates, have not and will not be able to meet demand (DEST 2002; AHWAC 2004).

The number of nurses who permanently leave nursing is reported as large and improved retention rates are critical to managing the current nursing workforce crisis and assuring there are sufficient nurses to replace the 'baby boomer' generation as they retire from the nursing workforce in the next ten to fifteen years (ICN 2004; Heath 2002). Undergraduate nursing students and graduate nurses represent the future of the nursing workforce and the consequences of student attrition and of new graduates leaving the profession will only exacerbate current and projected nursing shortages.

Interestingly, universities in the UK are currently expected to maintain a less than 13% rate of attrition or face financial penalty (Deary et al 2003). The Department of Health in the United Kingdom (UK) estimate attrition rates from pre-registration courses to be 20% for 2004/2005 and that 14.3% of newly qualified nurses and midwives choose not to enter their profession (RCN UK 2005). However the RCN UK state that there is a lack of accurate national data collected during pre-registration and midwifery education and little information is available on the number of nurses recruited, completing an undergraduate program, or graduating each year (RCN UK 2005). The Canadian Nurses Association (CNA) also cast doubts over the accuracy of reported nursing education statistics (CNA 2002). Completion rates for new nursing enrolments in 2001 was estimated at 60% or less, however there is substantial diversity in Canadian pre-registration programs and these attrition rates are not based on reliable sources (CNA 2002).

There is a paucity of national data in Australia that quantifies student attrition and graduate retention or describes the factors that influence an individual to enter an undergraduate nursing program and subsequently remain in the workforce. National statistics are reported on students who commence and complete their program but attrition rates are only calculated on all students and not reported by specific field of study (DEST 2004). Aggregate attrition rates for domestic undergraduate students has remained stable since 1994 at a rate of 20-21% but are not completely accurate as they include students who transfer across universities and who withdraw and re-enter their program at a later time (DEST 2004).

Since 1994, all registered nurses in Australia have been educated to bachelor degree level within universities and program completion by domestic students have steadily declined from 10,999 in 1994 to 7,794 in 2000 (DEST 2005). Even if attrition and graduate retention rates in nursing are similar or less than other professions, they still require accurate identification and quantification for

workforce planning, university enrolments and associated risk factors that can be modified.

Attrition from nursing programs and an exploration of why this happens has created considerable debate and a body of literature since the early 1930s (Rhinehart 1933; Lepley 1959; Plapp et al 1966). Common themes surrounding student attrition included: personality traits, such as degree of self-efficacy (Harvey and McMurray 1994) and suitability of personality for a career in nursing (Adib-Hajbaghery and Dianati 2005); specific entry characteristics of nursing students (Kevern, Ricketts et al 1999; Wharrad, Chapple et al 2003; Yarkin, Azoury et al 2003); academic demands of education programs (Mashaba and Mhlongo 1995; Kevern, Ricketts et al 1999; Ehrenfeld and Tabak 2000; Last and Fulbrook 2003; Glossop 2002); the changing demographic profile of commencing students eg. the 'maturing' of student ages and accompanying responsibilities including children and financial obligations (Marsland and Murrells 1996; Horner 2000; Glossop 2002; Brodie, Andrews et al 2004; Cuthbertson, Lauder et al 2004; Kevern and Webb 2004); ethnicity (Jalili-Grenier and Chase 1997; Klisch 2000; Gardner 2005); stress (Lindop 1991; Deary, Watson et al 2003; Brodie, Andrews et al 2004); and discordant perceptions students hold between what a nursing education program entails and what the realities are (Harvey and McMurray 1997; Brodie, Andrews et al 2004).

With respect to retaining graduate nurses in their first year as registered nurses, the literature suggests the importance of structured transitional programs for fostering retention (Loiseau, Kitchen et al 2003; Almada, Carafoli et al 2004); 'reality shock', a term that describes the gap between the undergraduate program and the realities of the workplace (QNC 2001; Boswell, Lowry et al. 2004; Casey, Fink et al. 2004; Duchscher and Cowin 2004); stress related to patient acuity and lack of experience (Beecroft, Kunzman et al 2001; Almada, Carafoli et al 2004); and concern about the quality of patient care, management issues and lack of guidance and support (Bowles and Candela 2005).

Despite the quantity of diverse writings on student attrition and graduate retention over several decades, there are surprisingly few high quality primary analytical studies underpinning these discussions. A great deal of discussion is in the form of theoretical commentaries (McSherry and Marland 1999; Greenwood 2000; Glossop 2001; Clare and van Loon 2003; Cowin and Jacobsson 2003; Wells 2003; Jackson and Daly 2004; Crow and Hartman 2005; Usher, Lindsay et al 2005; Crow and Hartman 2005a). Research studies are limited methodologically by being descriptive rather than analytical (Mashaba and Mhlongo 1995; Jordan 1996; Jalili-Grenier and Chase 1997; Klisch 2000; Glossop 2002; Squires 2002; Baillie, Allen et al 2003; Loiseau, Kitchen et al 2003; Wharrad, Chapple et al 2003; Brodie, Andrews et al 2004; Casey, Fink et al 2004; Robshaw and Smith 2004; Bowles and Candela 2005); rely on small

convenience samples (Mander 1987; Jordan 1996; Last and Fulbrook 2003; Almada, Carafoli et al 2004; Adib-Hajbaghery and Dianati 2005); and assess intentions rather than actually measure attrition or retention as outcomes (Cowin et al 2006; (Lindop 1991; Murrells and Robinson 1999; Beecroft, Kunzman et al 2001; Cuthbertson, Lauder et al 2004; Roberts, Jones et al 2004).

The aim of this paper is to systematically review the evidence in the published scientific literature for studies that quantify and examine factors associated with the attrition of undergraduate nursing students in pre-registration programs and the retention of graduate nurses in the workforce.

METHODS

Computerised databases were searched using EBSCOhost as a search tool for Medline (1966 to 2005) and CINAHL (1982-2005). The following five separate search strategies were used:

- (attrition OR retention) AND (nurs* OR graduate) AND (student OR education) AND (measurement OR factors);
- (nursing OR student OR curricula) AND (attrition OR retention);
- nurs* AND graduates AND strategies AND evaluation;
- (nurs* OR graduates OR curricula) AND (retention or attrition);
- nurs* AND graduate AND orientation.

The combined effort of the above searches yielded the following results: Medline produced 856 abstracts, CINAHL produced 1,535 abstracts. The search was then narrowed to published, primary articles and yielded 777 abstracts from Medline and 362 from CINAHL. On examination of the titles and abstracts of this body of literature by the first author [LG] of this review, 60 articles were retrieved. Rejected abstracts did not meet the study selection criteria. The references for these retrieved articles were examined, as well as employing a 'snowballing' strategy of subject headings and titles to further access abstracts and/or full text articles.

The PubMed database was searched under the 'systemic review' and 'clinical queries' categories using the above search terms. Searches were also performed on authors who had submitted relevant thesis for dissertation in PubMed 'single citation' category for published studies with no relevant results. Other databases searched included, PsycInfo, ERIC, Meditext, AMI, APAIS using a key word search, however no new or relevant literature was identified. The Cochrane Library was searched with one further study identified.

Overall, 73 full text articles were retrieved and assessed by the first and last authors of this review (LG

and CT), of which 60 were rejected on the basis of not using attrition or retention rates as their outcome measure. The remaining 13 articles were examined by three authors independently (TG, EY and CT), guided by the following selection criteria for this study:

- 1) study designs were to be observational and/or analytical (cross-sectional; case-control or prospective cohort studies);
- 2) the targeted population was undergraduate nurses or midwives, or new graduates; and
- 3) outcome measures were either attrition in undergraduate programs and/or retention of graduates within the workforce.

Four studies met all the inclusion criteria for this review and were subject to a further data extraction process conducted independently by the second and third authors (TG and EY) with the last two authors acting to reconcile differences (SS and CT). Assessment for the quality of the methodology of these studies was based on a standardised abstraction procedure (Centre for Reviews and Dissemination 2002). The data extraction pro-forma is available upon request and the results of the process are outlined in table 1. The nine excluded articles are shown in table 2 and reasons for their exclusion given.

RESULTS

This review found only four studies that met all inclusion criteria. Two studies were prospective cohort (or longitudinal) in design (Deary et al 2003; Harvey et al 1994) and two were cross-sectional (Harvey et al 1997; Kippenbrock et al 1996). All four studies examined undergraduate attrition as an outcome. No studies were found that examined retention of new graduates as an outcome measure. Only two of the four studies followed cohorts of students prospectively and were able to provide a high level of evidence, although each of these studies was designed to assess specific exposures as potential predictors of attrition, rather than assess actual factors associated with students leaving their program.

Prospective cohort studies examining factors associated with student attrition

Deary et al (2003) conducted a longitudinal study to investigate the predictors of, and relationships among stress, burnout and attrition in the nursing student. The sample population were diploma level students in Scotland undertaking nursing education between 1996 and 1999 in one college. Data was collected from a complete college year-of-entry cohort at four points: entry into the program (time 1 n=168); at 12 months (time 2, n=124); at 24 months (time 3, n=90); and on completion (no time specified and no numbers provided). Mean age of the sample was 24 years and 83% were female. There were six types of exposure measures, in the form of questionnaires, distributed at different time-points over the duration of the course. This study

tested for: general mental ability, personality attributes such as neuroticism, openness, and agreeableness; coping strategies; and three questionnaires surrounding different facets of stress.

The result of this study found that no relationship existed between stress, burnout and attrition, and in fact those who experienced greater degrees of stress and aspects of burnout were more likely to complete the degree.

Table 1: Studies of factors associated with nursing student attrition

Reference	Study Design	Outcome Measure	Study Population	Exposure Measure/s	Results
Deary et al 2003	Longitudinal	Comparison of completers and non-completers of course using variables assessed at time 1: sex, age, cognitive ability, personality, coping strategies and psychological distress.	Cohort of undergraduate nursing students at one Scottish institution followed for 4 years (1996-1999) from entry to course completion (n=168 in 1996; n=90 in 1998). No data provided at end of course.	The use of questionnaires, psychometric tests and college information. Data was collected at four time (T) points: entry (T1); 12 months (T2); 24 months (T3); and at end of program.	No relationship between stress, burnout and attrition found. Attrition 25% at 12 months.
Harvey et al 1994	Longitudinal	Undergraduate attrition rates	First year nursing students from four Australian tertiary institutions (n=306).	Nursing Academic Self Efficacy Scale (NASES); Nursing Clinical Efficacy Scales; Internality, Powerful Others and Chance Scales; Academic Self Efficacy Scales, and Commitment.	Attrition 27% at 12 months. Non-completers had significantly lower NASES scores (p<0.04); academic SE* scores (p<0.03); general SE (p<0.00004); GPA# (p<0.05); Internal LOC^ (p<0.06); less committed (p<0.001).
Kippenbrock et al 1996	Cross sectional survey at two points	Undergraduate attrition rates at two time points: 1983 and 1995 in semester following the survey.	14 nursing schools in the USA. 1983 (n=182). 1995 (n=209). Schools were randomly selected.	Bean's tool (103 items) including 8 attrition and retention subscales.	Students in 1983 had a higher likelihood of leaving compared to those in 1995 (p=0.02).
Harvey et al 1997	Cross sectional	Undergraduate attrition rates: number of leavers/number of enrolments over a two year period.	Nursing students who had commenced a three year course at a rural Australian college two years prior to the study (n=168). Questionnaires sent to both continuers (n=109) and leavers (n=59). Only (n=16) leavers responded.	Two version of same questionnaire sent depending on leaver/continuer status. Consisted of 18 items, including demographic information and student perceptions on clinical and academic issues.	Attrition rate over two years was 19.3%. Significant differences found between the leavers and completers were the differences in perceptions of course content (p=0.03) and seeking study skills advice behaviour (p=0.02).

*SE = self efficacy; # = grade point average; LOC^ = locus of control

Table 2: Studies retrieved but not selected (n=9)

First author (year)	Reason for exclusion
Almada 2004	Not a primary analytical study. A convenience sample selected at one hospital to evaluate a preceptor program.
Ehrenfield 2000	Not a primary analytical study. A correlation study of aggregate variables over time.
Glossop 2002	Not a primary analytical study. A retrospective cohort study based on an administrative database.
Grobler 2005	Protocol for a Cochrane review to examine retention in rural and under-served communities of all types of health professionals.
Horner 2001	Reports preliminary baseline data collected for proposed longitudinal study. No further study has been published to date.
Kevern 1999	Not a primary analytical study. A retrospective analysis of administrative datasets that examined the association between selected variables on admission to academic achievement and attrition. Individual data on reasons for attrition were not collected.
Klisch 2000	Not a primary analytical study. A review of the literature.
Mashaba 1995	Not a primary analytical study with attrition as an outcome. A cross-sectional survey of enrolled student's perceptions of factors associated with attrition. It is unclear how many of the 46 ex-students in the target population responded to the survey.
Wharrad 2003	Outcome measure was academic success rather than attrition.

In an Australian study, two nursing self-efficacy scales were developed to predict attrition in undergraduate nursing students (Harvey et al 1994). The main study was a three-year prospective cohort study of first year nursing students ($n=306$) aged between 17 to 45 years, and predominately female (88%) drawn from four Australian tertiary institutions. Variables were measured using the following: the Nursing Academic Self Efficacy Scale (NASES) with 22 items that measure student confidence in relation to learning education requirements of the course; the Nursing Clinical Self Efficacy Scale (NCSES) which has 24 items measuring student confidence in relation to learning skills of the course; Internality, Powerful Others and Chance Scales (IPC) to assess internal and external control; self-efficacy scale, general and social; academic self-efficacy scale measuring behaviours associated with progress in tertiary settings; and commitment which is a 12 item scale measuring 'hardiness'. The outcome measure was the comparison of variables of undergraduate attrition rates of three groups: those who left ('discontinues'); those continuing with intention to complete ('late'); and those who completed ('timely completion').

The results from this study showed 26.5% had left in the first year, 19% were 'late' and 52% of the cohort had completed the undergraduate year. The 'discontinues' had significantly lower means (7.28) on the NASES compared to those who did not withdraw and significantly lower GPAs than completers. Those who left were also significantly less committed, had lower IPC rates than completers, and rated lower on the self-efficacy scale. No differences were seen in the NCSES.

Cross-sectional studies examining factors associated with student attrition

Trends and factors associated with attrition across 14 United States of America baccalaureate nursing programs were examined in the years 1983 and 1995 by Kippenbrock et al (1996). The study involved a cross-sectional survey repeated at two time-points: 1983 ($n=183$) and 1995 ($n=209$), on different cohorts. No specific ages were given. The 1983 cohort had a response rate of 45% and consisted of 88 females and 94 males. The 1995 cohort had a response rate of 38%, with 108 male and 101 females.

The purpose of this study was to examine: trends and factors related to attrition in schools of nursing; nursing attrition rates to national student attrition rates; whether gender is associated with attrition; whether rates change over time; and finally, the determinates of nursing student attrition.

Variables were measured using Bean's tool, consisting of 103 items with eight student attrition and retention subscales. The results showed that attrition rates (first semester only) decreased from 12% in 1983 to 4% in 1995. A logistic regression model was used to calculate the risk of the nursing student leaving college, however

the only variable showing significance was for 'year' suggesting students had a higher likelihood of dropping out in 1983 than in 1994.

Harvey et al (1997) conducted a cross-sectional study to explore pre-enrolled students perceptions of what an Australian undergraduate nursing program involved and subsequent attrition rates. Two hypotheses were tested. The first was that those who left (leavers) would report a greater difference between their perceptions and their academic experience and secondly that leavers would rate certain potential stressors surrounding decisions to leave as more significant than those who chose to continue.

The sample comprised 168 student nurses from a rural Australian tertiary college who had commenced the three-year Diploma of Applied Science (Nursing) education in the two years prior to the study. From this population, 35% had withdrawn. Of the continuers ($n=109$), 57 returned the questionnaire, giving a 52.3% return rate, of which 82.2% were female aged between 18-40 years of age. Only 16 of the 59 leavers returned the questionnaire, a response rate of 45.7%. No significance difference was found with respect to age.

The results from this study found the two groups did not differ significantly with respect to difficulties encountered during clinical placements. In relation to academic experience, no significant differences in perceptions of unit difficulty between the two groups was evident, nor was a significant difference seen between the two groups on pre-entry seeking behaviour, or potential stressors such as financial, student life, and importance of factors to withdrawal factors. However this study found a significant difference between continuers and leavers concerning content of the nursing material in nursing education: 59.6% of continuers found the course differed from their pre-enrolled perceptions compared with 81.3% of leavers. Science subjects were cited as the most significant difference between student expectations and the reality. With respect to time and study management, the study found a significant difference in the seeking of advice on time and management and study skills, 93.7% of leavers did not seek such advice compared with 64.9% of continuers.

DISCUSSION

A major finding of this review is that despite the diverse writings about these issues there does not seem to have been a systematic approach to research. Any claims made by the few studies included in the review need to be tempered by methodological limitations or that these studies were designed to assess specific exposures as potential predictors of attrition, rather than assess actual factors associated with students leaving their program.

Of the four studies included in the review, two were limited by their cross-sectional design (Kippenbrock et al 1996; Harvey et al 1997). Strengths of the Kippenbrock et al (1996) study were the random sampling of several

schools and adequate adjustment for confounders such as age, gender, year level and GPA, although no odds ratios were reported. Limitations include a lack of external validity and generalisability due to little comparison between responders and non-responders with the follow-up of only one semester being too short to ascertain attrition rates.

Drawing conclusions from the second cross-sectional study (Harvey et al 1997) should be done with caution because of the small sample from one university and the disappointing response rates. Although this was the only study of the four that sought to obtain data from students who left the program, these findings were based on only 16 students from the one university who chose to respond to the questionnaire.

Deary et al (2003) ambitiously planned to follow a cohort of students at one university for the four year duration of their program. An attrition rate of 25% was reported after the first year of study. A serious limitation of this study is the loss-to- follow-up of 45% over the first two years which questions the internal validity of the results. No comparison was performed between those who remained in the study and those lost to-follow-up to ascertain sample bias and no data is provided for the final end-point at course completion, thus final attrition rates are not given. There is no discussion given for adequate controlling of confounders in the logistic regression model. It was also mentioned in the introduction that 'educational and clinical factors' were associated with attrition in nursing programs, however no assessment of this association was given. Strengths of this study include multiple measures of stress and burnout and validation of the instruments used.

Harvey et al (1994) followed a cohort of Australian undergraduates from one university for their first year of study with an attrition rate of 27%. The strength of this study includes the concerted effort to develop, validate and implement the NASES and NCSES as measurement instruments that had satisfactory consistency and reliability. Limitations of this study include no discussion of sampling bias, and no follow-up of those who left the study, thus generalisability is questionable. Internal validity is also of concern as there is no discussion of confounders or adjustment in analysis. Both longitudinal studies included in this review did not follow students who left the program to determine the reasons as their studies were designed to assess exposures at entry to the program as predictors of completion. Data from each longitudinal study were limited to only one university and are now over ten years old.

CONCLUSION

To the best of our knowledge this is the first published systematic review of empirical evidence examining factors associated with attrition of undergraduate nurses and retention of new graduates. A limitation of this

review is the introduction of possible biases through the search strategy. It needs to be acknowledged that although the review process may be subjected to individual interpretation by the authors, every effort has been made to comprehensively and exhaustively search the published scientific literature on this topic. In addition, to enhance the validity of the conclusions drawn and minimise bias, standardised and objective processes guided the independent reviewers.

This review has uncovered a paucity of research studies in the literature from which evidence quantifying attrition and the reasons why students leave undergraduate nursing programs can be obtained. No studies were found that quantified or examined retention of new graduates. Quantifying attrition can be achieved using aggregate annual university census data based on a single university program and/or a state-wide or national average across universities. Determining factors associated with attrition of undergraduates or graduate retention can only be achieved through a longitudinal cohort study and delineating any difference in associated factors across the two groups. Clearly there is a need to systematically track undergraduates and new graduates to the completion of their program and beyond to quantify and understand attrition, retention and workforce choices within the nursing profession and begin to build this evidence-base.

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