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A predictive model identifying latent variables, which influence undergraduate student nurses' achievement in mental health nursing skills

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A hypothetical model is developed to examine factors influencing nurses' achievement in a range of mental health nursing skills. The latent variables examined fall in four broad areas including the students':

- *background (gender, predominant language used, age, prior education, previous nursing experience),*
- *previous successes with other undergraduate nursing topics (physical sciences, nursing and psychosocial sciences study areas)*
- *attitudes toward mental health nursing and mental illness causation, and*
- *relationship between learning environment and achievement (consists of such factors as the type of venues used for mental health nursing experience and teacher influence in topic delivery).*

Student achievement in mental health nursing skills is estimated by measuring student's self-rated level of confidence to undertake 20 nursing related tasks (undertaken before and after a unit of mental health studies was completed by students) and scores achieved using a 50 item multiple choice tests mental health nursing. The model examining student pathways to achievement is tested using Latent Variable Partial Least Square analysis (LVPLS).

predictive model, latent variables, undergraduate student nurses achievement, mental health nursing skills

INTRODUCTION

Being able to provide health care services with qualified nurses who can maximise mental health for people in the community is one of the charters of the tertiary education sector through their undergraduate and post graduate nursing programs. This is not always an easy task based on the negative and typically stereotypical views held by the community generally about those with a mental health problem (Wolffe et al.1996), and (Brunton 1997). Additionally there have been recent structural changes to the health care system and this is happening at a time also when many western countries are closing many of their "mental hospitals" and returning long term patients with mental health problems back into the community. Arising from these communities are nursing students who are likely to have similar attitudes and outlooks towards others with a mental illness as the rest of the community. These beliefs would influence how they relate to patients with mental health problems. There are other different reasons why there are insufficient numbers of suitably qualified nurses who can meet the mental health needs of clients both in the hospital environment and within the community. It is argued that the mental health nursing profession has difficulty attracting nurses to their discipline because as nurse graduates emerge from their undergraduate programs, they are more focused on medically or surgically oriented practices (Happell and Rushworth 2000). Other factors suggest that the nurse undergraduate programs

themselves fail to deliver appropriate mental health skills development that can neither prepare graduates for their contemporary nursing roles (which includes mental health care) nor allows them to enter an appropriate pathway for advanced mental health studies (Clinton and Hazelton 2000). The number of nurses seeking to undertake post-graduate studies (and employment) in psychiatric nursing after their undergraduate work was dwindling to such an extent that the provision for effective psychiatric nursing care for patients was being undermined and the possible loss of this service area from nursing, was being advocated. This threat to the professional context of psychiatric nursing was directly linked with the lack of educational mechanisms that might attract nurses to post-graduate studies. One mechanism identified to counter this erosion was to re-assert a psychiatric nursing component at the undergraduate nursing level and to develop predictors that could be used in identifying variables which influence undergraduate nurse' achievement in mental health nursing skills.

METHOD

Participants

A sample of 183 undergraduate nursing students (commencing their third year of university studies) were targeted for the research project. Likert based questionnaires using a four point scales (strongly agree to strongly disagree and a very difficult task to a very easy task) were distributed to students. These voluntary responses were sought from students prior to them commencing a mental health module of study with related clinical practice and again were re-distributed after students had completed all clinical and theoretical requirements for the study module. This was over a thirteen week period.

Age of participating students ranged from 19-47 years of age (mean = 24 years with s.d. of 7.3 years). 162 students were female and the remaining 21 were male. 24 students used a language other than English as their first language with 159 students being native English speakers. 29 undergraduate students possessed a minor form of nursing qualification (enrolled nurse qualification), 14 students already possessing a bachelor degree other than nursing and 35 other students had partially completed some form of tertiary education. Remaining participants (115 students) had completed secondary school at year twelve level.

91% of the student cohort had not had any previous clinical contact with patients with a mental health disorder, with the remaining 17 students having a range of contact time with clients with a mental disorder (dementia usually) from 1 to 8 months at the time of the survey.

More than 54% of the students had learned nothing or very little about mental health nursing at the time of the survey with only 5 % stating that had learned a great deal about mental health nursing in the past. Asked if they wanted to work in the mental health area after graduating 37% did not respond at all, 24% indicated they would not like to, 21% were undecided with the remainder indicating this career choice positively. Just under half the student group (47%) believed that learning about mental health nursing would have a positive effect on the nursing practice overall, 15% of students were undecided, with only 2 students indicating it would be deleterious to their practice. 38% of students chose not to respond to this question.

Using latent variable path analysis (LVPLS) it was hypothesised that student success in mental health nursing could be predicted by an analysis of latent and manifest variables that could influence achievement. It was further hypothesised that any variation in achievement in mental health skills would be attributed to, by these variables.

INSTRUMENT

Rating scale questionnaires were used to collect attitudinal responses from third year nursing students at two stages, before and after their unit of mental health studies. In order to meet ethical considerations for this research project, participants were advised that their names were not required in order for the survey to be completed. They were also invited to respond and

advised that the survey completion was not part of their normal academic requirements but entirely voluntary.

Forty one items or statements relating to the mental health illness and nursing interventions were generated using the learning objectives of the topic that students were expected to undertake. The focus of 11 items of the questionnaire include students attitudes toward mental health/illness and:

- management of mental illness including use of medication;
- prognosis of illnesses;
- nursing education;
- diagnostic methods;
- causation;
- impact on personal relationships;
- funding for mental health services.

The remaining 10 items of the questionnaire examined the confidence the student nurses perceived themselves to have in relation to:

- communicating effectively with patients;
- undertaking an assessment including a mental state examination of patients
developing nursing care strategies;
- identifying appropriate patient care outcomes;
- being empathic with patients;
- teaching living skills;
- knowledge of psych-active medications;
- managing another who is aggressive;
- working within a multi-disciplinary team

With reference to figure 1, the relationships between the inner and outer variables are identified. 18 latent variables are defined by the inner circles and 38 manifest variables are represented by the outer squares.

A. Student background variables:

1. type of first language used: English or a language other than English;
2. age of the student;
3. their orientation to mental health nursing which included whether they thought a unit of study would benefit practice overall, whether they would they want to work in mental health upon graduating and if they had had an previous instruction about mental illness/health;
4. their prior education, if they already held a degree, enrolled nurse status, completed year twelve or had engaged in any prior study;
5. if any status was given toward their nursing studies or not.

B. Variables related to previous achievement within the undergraduate nursing program including their grade(s):

6. for first year nursing core topics (health assessment, foundation nursing studies and developmental health);
7. for first year psychosocial core topics (introductory sociology and communication skills);
8. for first year science topics (bio-physical science and anatomy and physiology);
9. for first year option topic (a humanities or science based option);
10. point average for all first year scores gained;
11. for second year nursing topics (law, ethics, introductory nursing theory and clinical practice);
12. for second year psychosocial core topics (health psychology and grades given by two different teacher engaged in that topic);
13. for second year science topics (pathophysiology and microbiology);
14. point average for all second year scores gained;

C. Student perception of the confidence to perform clinical skills, beliefs about mental illness causation and equity issues as they relate to people with mental illness:

15. student self rated Likert scales of confidence about skills (20 items), beliefs about illness causation and equity (prior to going out for clinical placement);
16. area of last clinical placement (hospital);
17. student self rated Likert type scales of confidence about skills (20 items), beliefs about illness causation and equity (after going out for clinical placement).

D. Achievement in mental health nursing (criteria variable)

This was estimated by compiling scores of 50% for each piece of completed work. An essay about a pre-determined mental health topic and completion of 50 item multiple choice examination featuring the following nursing problem-based scenarios:

- organic brain syndrome;
- anxiety;
- schizophrenia;
- affective disorders.

The teaching program was conducted over five weeks in which students were expected to spend four hours per week examining the following major themes:

- theoretical approaches to mental illness
- legal aspects and mental illness
- assessment techniques and nursing practice strategies for the following mental health problems:
 - organic brain syndromes
 - anxiety

- schizophrenia
- affective (mood) disorders

Clinical experience was offered to students over a 4 week period in which they could practice clinical skills accentuated during the theoretical component offered previously.

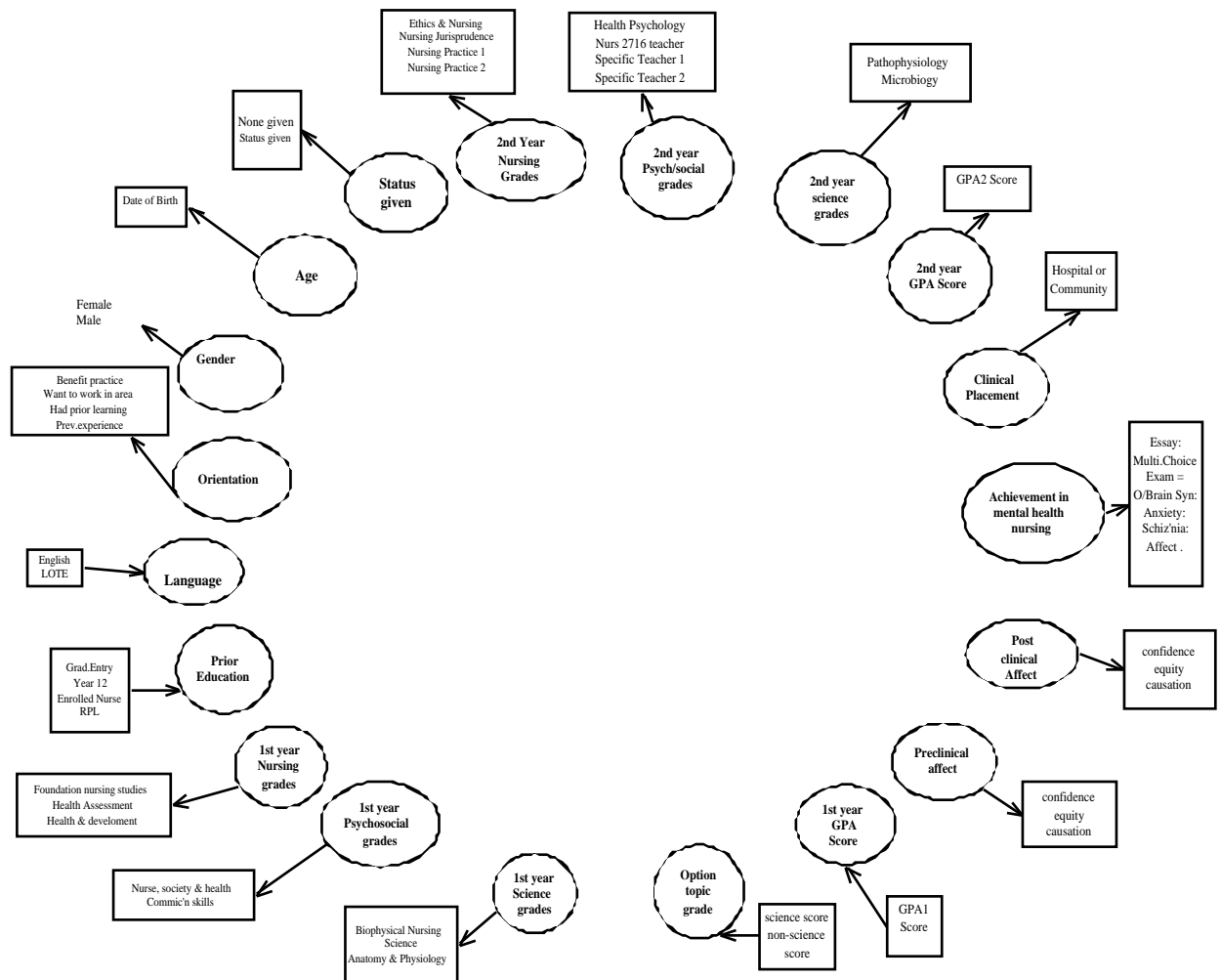


Figure 1: Hypothesised relationship between manifest and latent variables to achievement in mental health nursing

DATA ANALYSIS

Bi-variate correlation and factor analysis using SPSS was used to summarise the structure of variables related to student attitude towards patients with mental health illness. The principal components analysis in particular, was most useful for accounting for the spread or the variation of each dimension (attitude) within the multivariate space. To clarify what the student nurse attitudinal variables actually meant, varimax rotation was employed essentially to increase variable parsimony.

Then the Partial Least Squares Path (3.01) program (Sellin 1990) was used to generate the model of factors that influence achievement in mental health nursing and identified student pathways for achievement. This tool Latent Variable Partial Least Square analysis (LVPLS) is highly appropriate for analysing and predicting relationships between educational data. It is particularly helpful as it can deal with data that are not normally distributed which would otherwise be usually excluded in traditional research approaches. The main purpose of LVPLS

is for prediction and to identify where relationships may or may not exist (Noonan, R. & Wold, H. 1985). Additionally LVPLS can be used with relative small groups of data and yet remain very robust and in situations where not all the relevant variables are known or the relationship between the latent variables (theoretical constructs) and the manifest variables are unknown or speculative (Falk 1987). LVPLS is also the modelling method of choice as it can also account for influences that traditionally confound experimental approaches. This is because it is often physically impossible to administer randomised controlled conditions to elicit causality in many educational settings (Keeves, 1988).

RESULTS

The role of language on mental health nursing success

With reference to figure 2, which examines the direct effect and indirect effects of variables of achievement in mental health nursing, it can be seen that student use of language indirectly influences achievement through the variable of orientation. Examining this relationship between language used and orientation more closely, it can be seen that a negative correlation (-1.9) exists. This suggests that those students who use English as a second language did not believe as strongly as native English speaking students, that studying a module of mental health nursing would be beneficial for their nursing practice overall.

Student age and achievement

The age of the student has a direct negative effect (-.16) on their achievement in mental health nursing. This suggests that older students are less successful than younger students. Statistical differences between the age of students was found to be significant, in that older students had greater difficulty in their ability to correctly:

- Provide nursing activity for a client who was hallucinating (p=0.008);
- Recognise symptoms/behaviours associated with thought blocking (p=0.35);
- Assess for the level of lethality associated with clients with suicide ideation (p=0.049);
- Recognise the major clinical signs of depression (p=0.001);
- Initially defuse anger in a clinical situation (p=0.006);
- Understand the rationale for provide relaxation for an anxious client (p=0.021);
- Recognised the desired effects of anxiolytic medication (0.038);
- and provide nursing activity to minimise stressors for the anxious client (p=0.009).

A negative correlation (-.15) exists between students age and orientation to mental health practice. Significantly older students were less likely to want to work in the mental health setting than younger students.

The influence of prior education and achievement

A strong negative pathway extends from age to prior education (-.52) and it suggests that it is the older students that hold more prior qualifications than the rest of the student numbers. All students who either hold a degree, have attempted but not completed some form of tertiary education or hold minor nursing qualifications are over the age of 21 years of age. Prior education also possesses an indirect effect on achievement through a through the third latent variable of orientation to mental health nursing. This suggests that both the enrolled nurse group and the students already holding a degree did not want to work in the area of mental health at the completion of their training. Prior education also holds a direct and negative pathway with achievement in mental health (-.15). This suggests that compared to the whole

student cohort, the enrolled nurse group did significantly worse with four of the five major components of the multiple-choice examination. Students holding a degree on the other hand significantly achieved better in all major components of the mental health examination than other students.

Student orientation to mental health nursing and achievement

Between the latent variable orientation and achievement, a pathway co-efficient of .29 exists suggesting that the more a student had a positive outlook and believed their studies in mental health would better prepare them for practice, the better the achievement in mental health studies. Achievement was also positively correlated to the amount of learning students had done in the past about mental health/illness. The strongest association was between student belief that learning about mental health would help their practice overall and their overall achievement in the examination ($r=+.47$)

Confidence about skills development, beliefs about mental illness and achievement

The pathway between latent variable called post-clinical affect and achievement in mental health has a co-efficient value of 0.1 indicating that this variable describes only 10% of the achievement variable. It should be noted however, that between post-clinical affect and the latent variable of pre-clinical affect a strong path exists; ie .45. This suggests that there is a strong link between these two variables. Closer examination shows that of the 20 items examining confidence at performing nursing tasks before clinical placement as compared to after clinical placement, more students felt more confidence in dealing with over half of the nursing practices that were asked of them. Confidence with their understanding about medication did not change much at all. Students understanding of mental illness causation changed to after clinical placement. There was significant agreement that mental illness was multifactorial in origin rather than having a single form of causation as was believed at first. Of the fourteen items that examine student beliefs about rights and equity issues associated with a person with a mental illness, there was a significant change in attitude in only four items after clinical experience. There was greater agreement that such clients should be treated equally, that they can hold responsible jobs, they should have a stronger say in how mental health funds are actually allocated and they are as trustworthy as anyone else in the community. Students were not drawn any further after clinical about whether the community is the best place where clients should be cared for or not.

Student success with second year studies and achievement in mental health nursing

Latent variable eleven which consists of an aggregate of manifest variables from student's second year of study has strong pathway to mental health nursing success (.47). In other words 47% of variance associated with achievement in mental health is explained by success in second year nursing grades. It also has strong links with three other variables arising from first year studies in science (latent variable 8), the option topic (latent variable 9) and the first year grade point average for all topic studied. It is noted that there are no direct or indirect effects of psychology (latent variable 12) on the achievement in mental health nursing and the effects of placing student in clinical nursing areas (latent variable sixteen) related to mental health/illness, has negligible effects also.

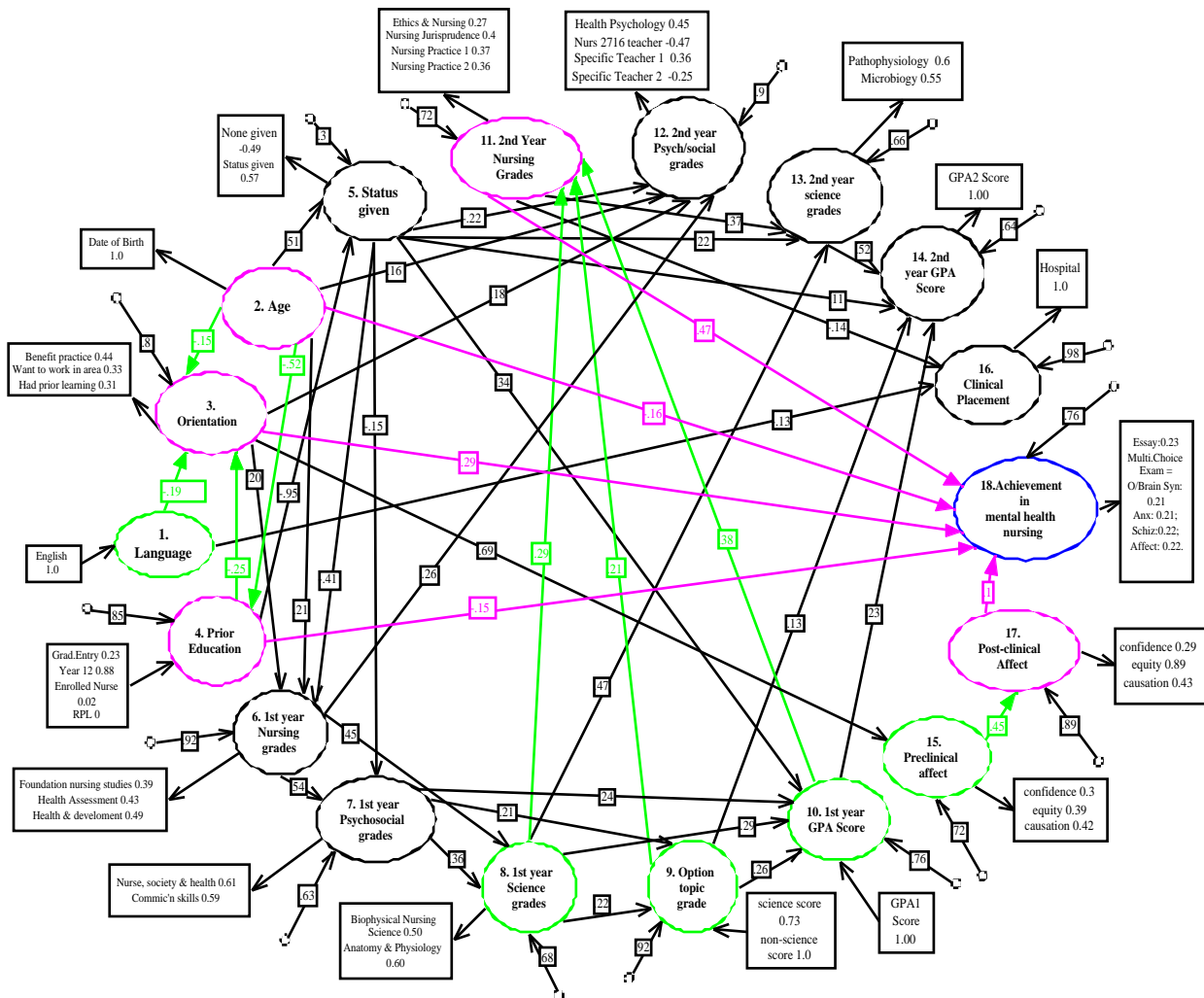


Figure 2: Final Model for Factors influencing Achievement in Mental Health Nursing

DISCUSSION

Background variables and achievement

From this study, students who use English as a second language believed there was no benefit to be derived for them by studying a topic in mental health nursing and language use was not a significant predictor for achievement in mental health nursing skills. This finding is consistent with another Australian study where confidence levels in nursing skill performance were not significantly related to language type (Bell et al. 1997). In terms of achieving correct answers on the multiple choice examination, students who used English as a second language in this study showed no difference in achievement compared to native English speaking students. This finding is not supported by other studies in which it is argued that such testing can be culturally biased or too technical (Rami et al. 1994) and (Byrd et al. 1999). In a multicultural society like Australia, it would be important for mental health nursing preparation programs to incorporate as many nursing students who possess cultural sensitivity and who are bilingual as such nurses are potentially very positive resources to meet the various ethnic groups that present for assistance with mental health disorders.

Older students in this study, experienced more difficulty with certain parts of the student assessment requirements. These areas of concern were seen to arise around the examination process itself rather than their capacity to acquire competence in clinically related mental health

nursing skills. This finding is supported by several other studies which suggest older student performed less well academically than younger students in nurse registration courses in the US (Briscoe et al. 1999) and for nurse registration examinations (Endres 1997). With a steady increase of mature aged students accessing Australian university educational programs including nursing, mental health nursing programs need to be cognisant that many of these students bring with them different degrees of hardiness (ie: their perceived level of commitment, control and challenge) and these attributes may be quite reliable forms of predictors for success other than success with paper and pencil tests (Wright et al 19998) and (Patton et al.1999). The nursing curriculum may need to modify its processes in order to successfully incorporate the older student who is coming into the nursing program to study.

One group of older students (compared to the younger secondary school undergraduates) that has demonstrated substantial achievements in mental health nursing, are those students who enter nursing already holding a degree from another discipline. These graduate entry students achieve well overall, both academically and clinically. Other studies have found similar results and it suggests that previous study at a bachelor degree level would be a reliable predictor for success in mental health nursing (Barr. 1998 and Kevern et al. 1999) Greater incorporation of graduate students into mental health nursing is likely to prove to be a potentially valuable resource. It is worth noting that currently graduate entry students enter nursing at the undergraduate level and are credited with one year status from the three year nursing degree, in recognition of their already held degree. At the end of two years study graduate entry nurses exit the university with another comparable degree and need to re-enrol if they wish to go on to take a higher degree. Alternatively, it may be better to offer a nursing program at a higher degree level (eg: at Masters level in mental health nursing) for graduate entry students in the first place as it may be more attractive to them and simultaneously meet the nursing professions' expectation to generate well-educated graduates for practice in the mental health area.

Student orientation to mental health nursing and achievement

Prior learning about mental health nursing has been seen to have a significant influence on achievement ($r=+.36$). Examining this relationship a little more closely, students achieved greater than 50% pass rate in sections of mental health examination paper. The most successful component of the examination paper arose from the completion of items as they relate to the nursing management of the client with organic brain syndrome i.e.: confusion. Students who have had previous experience with the aged care sector are likely to have had experience with this type of disorder. This relationship between variables highlights another important practice implication. Student nurses in this study, receive information about mental health practices in third year. Very little is given before this time. Yet nurses overall are coming into increasing contact with clients with mental disorders all the time and in health care settings not traditionally known for such interaction. With de-institutionalisation and closure of mental health facilities, clients are now seeking mental health care in community and acute care venues. At the same time, nurse's preparation for delivering specific care to these clients is delayed until late in their training. This suggests that nurses are not prepared for role in mental health nursing when in reality an expectation exists that they are able to practice in this area. Clearly achievement in mental health skills would occur more efficiently if access to mental health training was delivered much earlier within the overall nursing curricula.

Confidence levels at completing mental health nursing skills and success in mental health examinations and tests are not good predictors for success. Of the twenty items estimating student confidence, only two had significant correlations with the overall test achievement. In terms of student beliefs about illness causation and test achievement, three were statistically significant for achievement. Student values about equity issues as they relate to clients with a mental disorder were also not good predictors for test achievement either, in that three items estimating students values were statistically significant to the examination outcomes.

Reliability of achievement in other topics as a predictor for success in mental health nursing.

Forty-seven percent of the variance in achievement in mental health nursing is explained by the variable related to student grades obtained in their second year of the training (latent variable eleven). In turn, achievement in anatomy and physiology, and biophysical sciences studied in first year explain 50% of the second year grade successes, if the path co-efficient for the first year option topic is taken into consideration. This is an indirect effect but it is substantial. Literature is divided as to the predictability that can be afforded to science for success in nursing generally however, success in nursing has been directly attributable to grades obtained in physiology and pathophysiology (Alexander et al 1997 and Byrd et al, 1999). Student's past successes in science may be unreliable for predicting achievement in nursing outcomes, but student's self-efficacy rating for science has been cited as having a strong correlation to achievement (Caon et al 1992, Andrew et al 1998 and Ofori 2000).

The effect of the grade point average as a predictor for success in mental health nursing is not reliable as it has an indirect effect on mental health achievement. It does however have the capacity to predict achievement in the second year grades which in turn make some reasonable prediction for achievement in mental health nursing. The higher the grade point average the better the predictor for achievement in subsequent studies in nursing. (Alexander et al. 1997, Barkley et al 1998 Byrd et al 1999 and Reale, 2001). In relation to this study group, GPA scores for first year and second year was 4.9 and 4.1 respectively and these were significantly associated with mental health nursing examination scores at $r = +.27$ and $r = +.37$ respectively.

Achievement in mental health nursing is directly associated with student success in law studies, the two nursing studies units and the achievement with the topic that examines ethics and nursing practice. All of these topics fundamentally underpin content associated with the mental health nursing studies. The relevant mental health statutes serve to inform nursing practices in mental health as does the examination of different ethical dilemmas that are associated with nursing a patient with a mental disorder. The two nursing practice topics draw on previous learning such as communication skills, sociological concepts and different nursing theory as these have a strong application to mental health nursing. The later nursing topic (nursing practice 2) takes the concepts a step further by looking at development or lifespan approaches to health and illness, as they are presented by patients both in the hospital and the community. Students are required to analyse increasingly complex clinical scenarios, which require deeper integration of pathophysiology and pharmacology. While achievement in mental health nursing skills is strongly directed by these two nursing topics however, what seems to be lacking here is the non-existent influence latent variable twelve (health psychology) is having on mental health nursing achievement. This topic serves to broaden the approach nurses take toward patient care with mental disorders as it embraces different psychological theories that apply to patients and illness. Mental health nurses need to develop a wide range of skills (and not just ones that relate to a medical model) to satisfactorily blend with the eclectic approaches that are needed in contemporary mental health nursing. From this model, the effect of psychology to actually do this is minimal, and is therefore a poor predictor for success in mental health nursing.

The effect of clinical placement (latent variable sixteen) was minimal in terms of predicting achievement in mental health nursing practice. It had no direct effect on either achievement or student affect, as had been anticipated. It was believed that exposure to a mental health nursing clinical placement would assist student develop skills in promoting the nurse - client relationship, maximise their ability to assess for risks associated with mental health problems and gain first-hand experience in dealing with mental health problems. The use of diverse clinical settings particularly for experiential learning was seen to be the way to achieve this aim. While clinical placement in terms of this study was a poor predictor for success in mental

health nursing, Rhode (1996), Arnold et al. (1997) and Stevens et al. (1997) argue strongly for clinical exposure for students as a means of modifying their attitudes towards these patients.

CONCLUSION

Identifying reliable predictors for success in mental health nursing has centred on the previous achievements students have made in previous nursing or nursing related topics. In this sample of students, prior education has a direct influence on mental health nursing achievement, particularly if the student is a graduate. Age as a predictor for success is unreliable. Use of language is not a reliable indicator either but it can influence the student's outlook about the benefits of learning about mental health. In this sample, students with a positive approach toward mental health nursing or have a desire to work in the area and who have had some prior knowledge/experience about mental health nursing are positively correlated to for achievement in mental health nursing. GPA scores inform but are not reliable indicators for success either but provide broad guidelines for estimating success. This study has also shown that nurses can be prepared for mental health nursing practice quite adequately but not necessarily with a broad perspective that in reality is often required. Their achievement in the mental health nursing topic is essentially reflective of their understanding of a dominant medical model to explain mental illness and not broadly informed by other psychological theories. Achievement in psychology studies is therefore not a reliable predictor for success in mental health nursing. From this model, success in medical and surgical nursing topics is likely to be more reliable predictor than achievement psycho-social topics.

To identify additional predictors for success in mental health nursing, further study is needed particularly taking a multi-level approach. This study has confined itself to one dimension or level by examining student attributes and their achievement to predict success in the undergraduate mental health nursing program. What is now called for is to re-examine these variables and simultaneously explore the effects of the learning institution on student achievement in mental health nursing, such as class size and the way the mental health program is delivered.

BIBLIOGRAPHY

- Alexander, J. & Brophy, G. (1997) A Five-Year Study Of Graduates' Performance On NCLEX-RN. **Journal Of Nursing Education**. V36 n9 p443-445 November.
- Andrew, S. & Vialle, W. (1998) Nursing Students' Self-Efficacy, Self-Regulated Learning and Academic Performance In Science. (<http://www.swin.edu.au/aare/98pap/and98319.htm>) University of Wollongong
- Arnold, W. & Niewswiadomy, R. (1997) A Structured Communication Exercise to Reduce Nursing Students' Anxiety Prior to Entering the Psychiatric Setting. **Journal of Nursing Education**. Vol.36.N.9.pp446-447. November
- Barr, J.M. (1998) Interdisciplinary Research: Predicting Academic Success In The Nursing Program. (<http://www.drury.edu/faculty/ess/irconf/Jbarr.html>)
- Bell, A., Horsfall, J. & Goodin, B. (1997) A Multi-centre Comparative Investigation of the Impact of Undergraduate Mental Health Nursing Curricula and Clinical Experience on Attitudes, Skills and Clinical Confidence. **Report to the Department of Employment, Education, Training and Youth Affairs. Department of Behavioural and Social Sciences in Nursing, University of Sydney.**
- Briscoe, V.J. & Anema, M.G. (1999) The Relationship of Academic Variables as Predictors of Success on the National Council Licensure Examination for Registered Nurses in a Selected Associate Degree Program. **ABNF Journal**. Vol.10 No4.p80-83. July-August.
- Brunton, K. (1997) Stigma. **Journal of Advanced Nursing**. Vol.26.pp891-898.
- Byrd, G., Garza, C. & Niewswiadomy (1999) Predictors of Successful Completion of a Baccalaureate Nursing Program. **Nurse Educator**. Vol.24. No.6. P33-37.
- Clinton, M. & Hazelton, M. (2000) Scoping Mental Health Education. **Australian and New Zealand Journal of Mental Health Nursing**. V9.

- Endres, D. (1997) A Comparison of Predictors of Success on NCLEX-RN for African, American, Foreign-Born and White Baccalaureate Graduates. **Journal of Nursing Education**. V36.N.8. October.
- Falk (1987) **A Primer for Soft Modelling**. University of California. Berkley
- Happell, B. & Rushworth, L. (2000) Can Educational Methods Influence the Popularity of Psychiatric Nursing? **Nurse Education Today**. V20 p318-326.
- Keeves, J.P. (1988) Longitudinal Research Methods. In : **Educational Research Methodology and Measurement: An International Handbook**. Keeves, J.P. (ed) Oxford, Pergamon Press
- Kevern, J., Ricketts, C. & Webb, C. (1999) Pre-registration Diploma Students: A Quantitative Study Of Entry Characteristics And Course Outcomes. **Journal of Advanced Nursing**. v34 n4 p785-795
- Levy, S. & Howles, K. (1995) **The Journal of Forensic Psychiatry**. Vol.6.pp19-39.
- Noonan, R. & Wold, H. (1985) Partial Least Squares Path Analysis. In: **The International Encyclopaedia of Education, Research and Studies**. Husen, T. & Postlethwaite, T.N. (eds) Oxford, Pergamon Press.
- Ofori, R. (2000) Age and "Type" of Domain Specific Entry Qualifications as Predictors of Student Nurses' Performance in Biological, Social and Behavioural Sciences in Nursing Assessments. **Nurse Education Today**. Vol.20.ps298-310.
- Patton, J. & Goldenberg, D. (1999) Hardiness and Anxiety as Predictors of Academic Success in First-Year, Full-time and Part-time RN Students. **The Journal of Continuing Education in Nursing**. V30.n4.July/August.p158-167
- Rami, J. & Hansberry A. (1994) Educating Minority Students For The Health Professions: Taking A Quantum Leap To Meet The Challenge. **Education**. V115 n1 p80-87 Fall.
- Rhode, D. (1996) Uncovering a World of Mental Illness: An Analysis in Perceptual Transformation in Undergraduate Nursing Students. **Archives of Psychiatric Nursing**. Vol.10.N.6.pp347-354. December
- Sellin, N. (1990) **PLSPATH Version 3.01 Program Manual**, Hamburg.
- Setvens, J. & Dulhunty, P. (1997) A Career with Mentally ill People: An unlikely Destination for Graduates of Pre-registration Nursing Programs. **The Australian Electronic Journal of Nursing Education**. Vol.3 n.1
- Wolff, G., Pathare, S., Craig, T. & Leff, J. (1996) Community Knowledge of Psychiatry and Reaction to Mentally Ill People. **British Journal of Psychiatry**. Vo.168.pp191-198.
- Wright, C. , Frew, T. & Hatcher, D. (1998) Social and Demographic Characteristics of Young and Mature Aged Nursing Students in Australian Universities. **Nurse Education Today**. Vol.18.p101-107