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Student Stress and Academic Performance: Home Hospital Program

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ABSTRACT

The purpose of this study was to evaluate whether students assigned to a home hospital experience less stress and have improved academic performance. Students were assigned to a home hospital clinical placement (n=78) or a control clinical placement (n=79) for the four semesters of the nursing program. Stress was measured each semester using the Student Nurse Stress Index (SNSI) and Spielberger's state anxiety scale. Academic performance included: 1) score on a standardized mock NCLEX-type test at the end of the program; 2) nursing grade point average (GPA); and 3) first attempt pass/fail on the state nursing board licensure exam (NCLEX). There were no statistically significant differences between the two groups for age, sex, marital status, ethnicity or score on the entering nurse entrance exam. There were significant changes in student perceptions of academic load, clinical concerns, interface worries and state anxiety over time, but no statistically significant differences between the groups. Academic load and state anxiety showed an interaction of time by group, with the HH group showing reductions over time in comparison to the control group. There were no statistically significant differences between the groups on their nursing GPA, a Mock NCLEX exam or the percentage of students who passed the NCLEX on their first try. Despite differences in student anxiety and perceptions of academic load, these differences were not large enough to impact academic performance.

Keywords: Nursing students, stress, anxiety, clinical

Today's college students are under greater stress than those of the past; many students work and have family responsibilities in addition to their academic workload. Nursing students experience and report stress as they progress through their nursing programs (Elfert, 1976; Godbey & Courage, 1994; Sawatzky, 1998). This stress is undoubtedly related to the intensity and complexity of nursing programs, including the large amounts of time spent learning in a clinical setting. Elfert reported that nursing students found clinical experiences satisfying, but also a source of increasing stress throughout their nursing program. Stress is particularly important in education because it has the potential to impede human learning and functioning and may lead to attrition.

Recent studies have continued to examine the stress in nursing programs (Deary, Watson & Hogston, 2003; Tully, 2004) and ways to decrease it (Evans & Kelly, 2004; Gammon & Morgan-Samuel, 2005). Evans & Kelly examined stress and coping measures used by students nurses. Examinations, the level and intensity of academic workload, the theory-practice gap, and poor relationships with clinical staff were the leading stressors involved. Gammon & Morgan-Samuel summarized twelve intervention studies to decrease nursing student stress published between 1990 and 2001. These studies involved stress management, relaxation, exercise, peer-mentoring and tutorial support and generally these interventions led to a reduction in student stress or anxiety. In a quasi-experimental posttest design, they provided structured student tutorial support to an experimental group of nursing students in Wales. This intervention led to a reduction in the mean total SNSI score for those in the experimental group (68.7) versus the control group (82.9).

For nursing students, the academic program includes clinical experiences, which may augment stress even further. A significant portion of student stress is based on experiences in the clinical environment (Evans & Kelly, 2004; Elfert, 1976). When nursing programs are located in a rural setting or small metropolitan area, there is likely to be only one or two nursing programs in the area and clinical settings are limited. Therefore, students tend to fulfill their clinical experiences at just a few settings. In contrast, nursing programs located in large metropolitan areas may compete with numerous other nursing programs for educational sites at a large number of clinical agencies. These programs generally assign students to different clinical agencies to complete their clinical training. At UNLV, students may fulfill their clinical requirements at 4-8 different health care agencies. This requires that students spend valuable clinical time in orientation for each new agency; the multitude of settings may create additional stress and may detract from learning.

With these issues in mind, we talked with Chief Nursing Officers at 3 local hospitals (a public county hospital, and 2 private for profit hospitals) to design a Home Hospital program. In this program, students would be assigned to one hospital for as many rotations as possible. In most cases, this included all of the medical-surgical rotations, and possibly obstetrics and pediatrics if the hospital provided these services. In accordance with our State Board of Nursing requirements, clinical instructors needed a BS in nursing and an MS in nursing or a health-related field. In a half-day program, UNLV provided orientation to the nursing program, philosophy, curriculum and policies. Clinical instructors then met with the course coordinator, who provided an overview of the course and requirements and grading materials. A UNLV faculty member was

designated for each Home Hospital clinical instructor to serve as a liaison, visit the clinical staff a number of times throughout the semester, and be available by phone for consultation.

The hospitals assigned qualified staff to work as clinical instructors one day per week to supervise each group of 8 students and were paid by our university \$2500 per credit (1 credit = 45 hours of clinical instruction). Table 1 shows the courses that the hospitals were generally able to cover with their staff. We started off with our first semester course only and then each semester added another level until we reached the full component of courses.

Insert Table 1 about here

The purpose of this study was to evaluate whether students assigned to a home hospital experienced less stress and anxiety and improved academic performance than those not assigned to a home hospital. To our knowledge, this is the first study to examine student stress and academic performance based on clinical placement assignment.

METHOD

Design

A quasi-experimental two-group design was used. This study was reviewed by our institution's Office for the Protection of Human Subjects and was deemed to be exempt. Nonetheless, the study was described to all students during their orientation program. Demographic, attitudinal and academic data were collected and analyzed following the students from the time they were admitted to the nursing program and continuing through their completion of the NCLEX examination.

Sample

Using a convenience sample, all students admitted to the nursing program between fall 2005 and fall 2006 were included in the study. Our home hospital program began with our entering nursing students in fall 2005. Half of our Level 1 students were assigned to one hospital for the majority of their clinical experiences. They were assigned to other settings only if the home hospital did not offer a specific clinical experience. For example, since all hospitals do not provide obstetrical, pediatric, and psychiatric services, students were assigned to a facility other than their home hospital for these experiences. The other half of the students were assigned using our current, somewhat random, method of assigning students to various hospitals around the city without consideration of where they had been in previous semesters. We continued data collection this until 4 cohorts of students completed their education (a total of 175 students).

Expected state anxiety scores were used to determine the sample size for this study, because Spielberger's scale is widely used and has high validity and reliability. One goal was to test the null hypothesis that the state anxiety means of the two groups are equal over time. We anticipated a difference of 4.0 ± 9.0 , based on previous reports of nursing students (McEwan & Goldenburg, 1999; Suliman & Halabi, 2006). With a 2-tailed test and alpha set at .05, 81 students are needed per group to achieve a power of 80% (SamplePower 2.0, SPSS Inc, Chicago, IL). While we recognize that there will be attrition and changes in clinical placements that necessitate excluding some student data from analysis, the repeated measures ANOVA should ensure that power is sufficient.

Dependent Variables

Student Nurse Stress Index (SNSI)

The SNSI was developed by Jones and Johnston (1999) and measures sources of stress (stressors). This 22-item Likert-style scale ranges from 1 (not stressful) to 5 (extremely stressful). It has a four factor structure: academic load (7 items), clinical concerns (7 items), personal problems (4 items), and interface worries (7 items), as underlying variables. Items related to academic include “amount of classwork material to be learned” and “difficulty of classwork material to be learned”. Items related to clinical concerns include ‘client attitudes towards me” and “relations with staff in the clinical area”. Items related to personal problems include “fear of failing a course” and “relationships with parents”. Items related to interface worries include “lack of free time” and “school response to student needs”. Score ranges for academic load, clinical concerns and interface worries are 7-35 and for personal problems 4-20. The SNSI shows cross-sample factor congruence, good internal reliability and concurrent and discriminate validity (Jones & Johnston). It takes less than 5 minutes to complete.

Spielberger’s state anxiety scale

Spielberger’s Trait Anxiety Inventory (Spielberger, Gorsuch, Luchene, Vagg, & Jacobs, 1983; Spielberger, 1991) was used to measure anxiety. State anxiety involves how respondents feel “right now, at this moment” and therefore was expected to be able to detect changes over the 4 semesters of the program. This 20-item Likert-style scale ranges from 1 (almost never) to 4 (almost always). It is scored by summing the items. Final scores fall between 20 and 80. It takes less than 5 minutes to complete.

Nursing GPA

Nursing GPA was calculated based on grades received in 60 credits that compose the nursing curriculum at UNLV.

Nurse Entrance Test

The “Nurse Entrance Test” (NET), published by Educational Resources, was administered to students upon admission to the School of Nursing. Reliability of the NET was examined using a parallel-forms method. Subtest reliability coefficients were .98 for reading comprehension and .81 for math (Educational Resources, Inc., 2004). Criterion-related validity is reflected by a substantial relationship between performance on the NET and ACT.

RN CAT (“Mock NCLEX-RN”)

The RN CAT, published by Educational Resources, was administered to students during the last week of their nursing program. This computer adaptive test simulates the actual NCLEX-RN in regard to varied timing and number of questions for students based on their answers. The set pass rate is 62 (set at 50th percentile).

NCLEX

Whether students passed or failed the NCLEX the first time they took it was obtained from the quarterly reports sent by the National Council of State Boards of Nursing.

Procedure

During orientation to the nursing program, students were asked to complete a demographic form, providing information on age, sex, marital status, and ethnicity; they also completed the NET test. Throughout the next four academic semesters, students were asked to complete the SNSI and state anxiety scale midway through their clinical experiences. Students entered their ID on these forms to ensure anonymity. These scales

were then scored by an administrative assistance, spot verified for accuracy by one of the authors (CBY), entered into an excel data file, and destroyed.

Students' names and assigned ID codes were included in the file until data entry and verification were complete. Student names were then deleted. The data file contained a large number of missing data. Therefore, our statistician (CC) did a basic data imputation using a regression estimate to impute the missing values. Essentially the method builds a regression model using the data that are present and then uses this model to estimate the missing values. This method is often claimed to be biased in that the data that are estimated have no random error associated with them. However, he added a random error component to the model to avoid this problem (Tabachnick & Fidell, 2007; West, Butani, & Witt, 1991). The computer drew a random variate from a normal distribution with expected value = 0 and a standard deviation equal to the mean square error of the regression model. The percentage of missing data by variable ranged from 8% to 28%. Though this appears relatively high, a validity check of the final estimates was excellent; the mean values and standard deviation values before and after imputation were within 2-5% of one another, indicating that that the differences in means discussed below was not an artifact of imputation.

Demographic and academic data comparing the groups were analyzed using chi-square analysis, and t-tests. Pearson's bivariate correlations were done to examine relationships among variables. Repeated measures (SNSI and anxiety) were analyzed using repeated measures analysis of variance. All analyses were done using SPSS 14.0 for Windows.

RESULTS

Of the 175 students who entered the program, 18 (10%) dropped out or fell behind the rest of their cohort. These students were not included in the data analysis, leaving 157 students' data to consider. Their characteristics are shown in Table 2. There were no statistically significant differences between the two groups on age ($t = -.35$, $p = .729$) and entering NET test ($t = -.50$, $p = .620$); or sex ($\chi^2 = .135$, $p = .713$), marital status ($\chi^2 = 1.379$, $p = .502$), and ethnicity ($\chi^2 = 3.076$, $p = .688$).

Insert Table 2 about here

Attitudinal Measures

The mean and standard deviation of the four SNSI subscales and the state anxiety scores over the four semesters of the program are shown in Table 3. These repeat measures were highly related to one another over time with correlations (Pearson's r) ranging from .222 or .487 ($p < .005$ or less). Within each semester or time period, the measures were also highly with one another, with correlations ranging from .195 or .685 ($p < .005$ or less).

There were significant changes in student perceptions of academic load ($p < .001$), clinical concerns ($p < .01$), interface worries ($p < .001$), and state anxiety ($p < .05$) over time, but no statistically significant differences between the groups. Academic load and state anxiety showed an interaction of time by group ($p < .05$), with the HH group showing reductions over time in comparison to the control group. These interactions are shown in Figures 1 and 2.

Insert Table 3, and Figures 1- 2 about here

Academic Measures

The mean nursing GPA for the entire group of students was $3.28 \pm .29$, based on a 4-point scale. The Nursing GPA did not differ between the two groups (HH: $3.28 \pm .27$; Control: $3.28 \pm .31$). The mean RN CAT score for the entire group of students was 77.3 ± 10.1 . There were no statistically significant differences between the groups on the RN CAT (HH: 77.2 ± 9.9 ; Control: 77.7 ± 10.3) or the percentage of students who passed the NCLEX on their first try (HH: 83%; Control: 81%).

GPA was positively associated with both the NET ($r = .222$, $p < .01$, one-tailed) and RN CAT ($r = .205$, $p < .01$, one-tailed), but the NET and RN CAT were not associated with one another. A comparison of those passing and not passing the NCLEX exam on the first attempt showed a higher NET score (79.7 ± 8.3 vs. 74.0 ± 9.8 , $p < .01$), a higher RN CAT score (78.0 ± 8.3 vs. 73.0 ± 11.0 , $p < .05$), and a higher GPA ($3.36 \pm .27$ vs. $3.03 \pm .22$, $p < .001$) among those passing on the first attempt.

Relationships of Attitudinal and Academic Measures

To examine the relationships between attitudinal measures and the academic measures, we averaged the anxiety and SNSI subscale scores individually over the 4 semesters, providing mean scores for each of these over the 4 semester program. There were small statistically significant associations in a few of these variables, the others were not associated. The RN CAT was associated with state anxiety ($r = .191$, $p < .05$) and mean academic load ($r = .182$, $p < .05$); student GPA was negatively associated with mean academic load ($r = -.291$, $p < .001$) and mean interface worries ($r = -.195$, $p < .05$).

DISCUSSION

We have shown that assigning students to a home hospital may lead to a reduction in the students' perception of academic load and state anxiety over the 4-semester program. This does not, however, appear to impact academic performance.

Evans and Kelly (2004) studied nursing students in Ireland and showed that nursing students report high levels of educational stress (including that caused by examinations, and the intensity and difficulty of the academic work) and clinical stress (including conflicts between ideal practice and the real situation in the clinical setting, unfriendly atmosphere and poor communication on the hospital unit). Our finding of decreased perception of academic load in HH students may be related to greater clinical consistency. The close collaboration between university faculty and hospital staff may have reduced some of the clinical stress.

Our students reported high state anxiety (mean range 43.5-47.7) in comparison to non-nursing college students, regardless of the group to which they were assigned. The mean state anxiety scores for female college students was reported to be around 38.8 (n=531, Spielberger et al., 1983). More recent studies report a state anxiety of 36.2 in 210 male and female students (Johnson, Vincent, Johnson, Gilliland & Schlegel, 2008). Wertz, Garvin and Damson (2008) reported a state anxiety in females of almost 36 and in male of about 33. We did not find a sex-dependent difference in state anxiety. The high level of state anxiety in our students is consistent with other reports of nursing students in Canada (41.2 ± 10.2 ; McEwan & Goldenburg, 1999) and Jordan (46.5 ± 8.64 ; Suliman & Halabi, 2006).

It is interesting that state anxiety rose so much in the control group during level 2. This semester students are typically in 2 different agencies on three different units, for

their pediatric, obstetric and geriatric experiences. They are no longer “new” nursing students and they are expected to provide competent clinical care. Those in the experimental group are not exposed to so many different clinical sites and may therefore experience less anxiety. Elfert (1976) observed that when students entered the clinical portion of their programs, their major concerns changed from academic and personal stressors to those found in the clinical setting. These were primarily related to the strangeness and difficulty of adjusting to the hospital setting.

A number of limitations must be recognized. First, this study is limited to student experiences at one institution over a 2.5 year period. Among all of the students, three of the SNSI subscales and the state anxiety scale decreased significantly over time. While there were statistically different interactions of time by group for academic load and state anxiety, these differences were not large enough to be “clinically significant” in terms of academic performance. Because this was our first experience using agency staff as clinical instructors, there was a great deal of learning on our part and that of the clinical instructors. Therefore, earlier cohorts may not have benefited as greatly by this program as later cohorts. Nonetheless, we believe that the home hospital model is a win-win model for all concerned.

Over the past 5 years, it is becoming increasingly difficult to coordinate clinical placements in southern Nevada. We now have 7 schools of nursing on 7 different clinical rotation schedules and most of these schools have plans to increase their student numbers over the next few years. We also have 12 hospitals and a myriad of other clinical agencies that provide settings for clinical experience for nursing students. Thus clinical placements require a great deal of coordination.

If students are placed in a variety of different settings as they progress through their nursing programs, they may lose up to 2 clinical days in orientation each semester. If we were able to keep students at the same hospital, their “home hospital”, for as many rotations as possible, we would be able to reduce orientation time and have more time for patient care experience. Students also benefit by becoming familiar with their clinical settings and therefore being able to focus on patient care, rather than on where to park or finding supplies.

The hospitals might also benefit if they could keep the same students in their facility. First, the staff would get to know the students and their clinical skills, creating less confusion on the units and perhaps encouraging the staff to take greater interest in the students’ education. Second, students would become the “hospital’s students”. This would provide opportunities to mentor and court students to join the hospital’s staff upon graduation. Finally, if these students joined the hospital staff after graduation, they are likely to have a reduction in orientation time allowing them to assume the staff nurse role more quickly. One of our three hospitals was highly successful in employing students, hiring approximately 75% of those assigned to them. This same hospital reported that their staff enjoy working with our students and the program has encouraged staff nurses to continue their education.

In summary, we believe that the home hospital model is a useful one to consider in large cities with multiple hospitals and nursing programs. Informal feedback from students has been positive and the partnership with local agencies has been beneficial to them and to UNLV.

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Table 1. Hospital-Based Clinical Courses

Course	Clinical Credits
NURS 305 Patient Centered Care: Basic Principles	3 - Fundamentals
NURS 319 Nursing Care of Older Populations	3 - Gerontology
NURS 331 Nursing Care of Childbearing & Childrearing Families	1.5 - Pediatrics 1.5 - Obstetrics
NURS 415 Nursing Care of Acutely Ill Populations	3 - Med/Surg
NURS 425 Complex Nursing Care in Diverse Populations	4 - Complex patients

Table 2. Description of Nursing Students

Descriptor	Home Hospital Group (n=78)	Control Group (n=79)
Age	24.3 ± 5.2	24.6 ± 5.6
Nurse Entrance Exam	78.6 ± 8.1	79.3 ± 9.5
Sex: Male	14 (18%)	16 (20%)
Female	64 (82%)	63 (80%)
Marital Status: Single	58 (75%)	52 (66%)
Married	16 (20%)	22 (28%)
Divorced/Separated	4 (5%)	5 (6%)
Ethnicity: White	40 (51%)	45 (57%)
Asian	18 (23%)	16 (20%)
Hispanic	6 (8%)	6 (8%)
African American	2 (3%)	3 (4%)
Pacific Islander	11 (14%)	6 (8%)
Unknown	1 (1%)	3 (4%)

Age and Nurse Entrance Exam are reported as mean ± standard deviation;

Others are reported as n (%).

Table 3. Attitudinal Measures

Measure	Semester 1		Semester 2		Semester 3		Semester 4	
	HH	Ctrl	HH	Ctrl	HH	Ctrl	HH	Ctrl
Academic Load ^{1,4}	24.8 ± 4.8	23.6 ± 4.4	23.0 ± 4.9	23.3 ± 4.2	22.3 ± 3.9	23.7 ± 4.6	21.8 ± 5.2	22.5 ± 5.5
Clinical Concerns ²	16.9 ± 5.9	15.9 ± 5.2	17.6 ± 5.2	18.2 ± 4.8	16.4 ± 4.8	17.7 ± 5.3	16.3 ± 5.3	16.5 ± 5.1
Interface Worries ¹	23.2 ± 4.6	21.7 ± 5.0	20.3 ± 6.1	20.2 ± 6.0	20.7 ± 4.6	21.6 ± 4.9	20.6 ± 5.7	20.4 ± 5.7
Personal Problems	8.8 ± 3.6	9.0 ± 3.6	9.0 ± 4.5	9.5 ± 4.3	9.0 ± 3.2	9.5 ± 3.5	9.3 ± 3.7	9.5 ± 3.6
State Anxiety ^{3,4}	47.7 ± 12.6	45.0 ± 12.7	44.5 ± 10.6	47.5 ± 10.3	43.7 ± 10.4	43.5 ± 11.2	43.6 ± 9.8	45.2 ± 11.3

HH = Home hospital group; CTRL = control group.

All reported as mean ± standard deviation.

¹Statistically significant difference over time, $p < .001$

²Statistically significant difference over time, $p < .01$

³Statistically significant difference over time, $p < .05$

⁴Statistically significant difference, interaction time by group, $p < .05$

Figure 1. Changes in student perception of academic load over the 4 semesters of the program. The solid line represents those in the home hospital program; the dashed line represents those in the control group. Differences were statistically significant for time ($p < .001$) and interaction of time by group ($p < .05$).

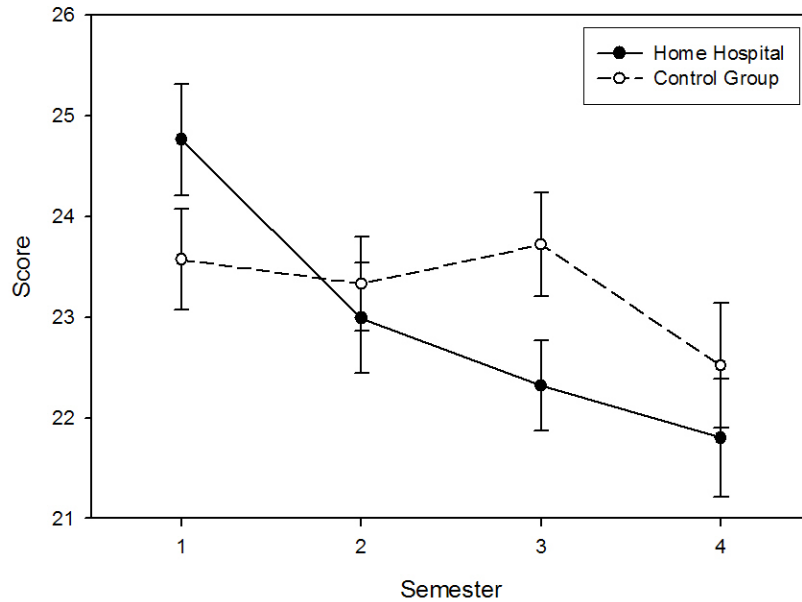


Figure 2. Changes in student state anxiety over the 4 semesters of the program. The solid line represents those in the home hospital program; the dashed line represents those in the control group. Differences were statistically significant for time ($p < .05$) and interaction of time by group ($p < .05$).

