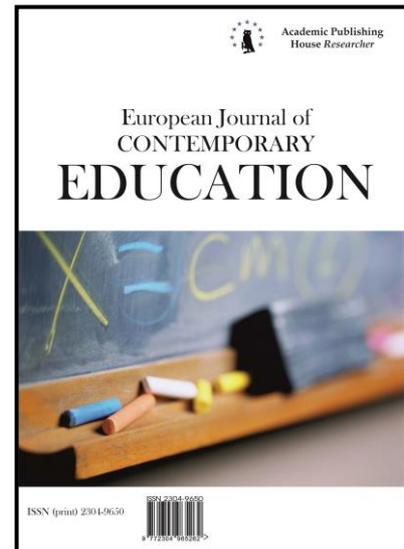




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Students' Demographic, Academic Characteristics and Performance in Registered General Nursing Licensing Examination in Ghana

Patience Fakornam Doe ^{a,*}, Elizabeth Agyeiwaa Oppong ^a, Jacob Owusu Sarfo ^{a,b}

^a University of Cape Coast, Ghana

^b All Nations University College, Ghana

Abstract

The decreasing performance of student nurses in the professional licensure examinations (LE) in Ghana is a major concern to stakeholders, especially at a time when the nurse-patient ratio stands at 1: 1500. The study sought to determine the effect of students' demographic and academic characteristics on performance in the Registered General Nursing (RGN) LE. A descriptive retrospective study was conducted using a researcher designed checklist to review the administrative and academic records of 324 nursing students who wrote the RGN LE between 2007 and 2012. A stratified sampling method was used to select the participants for the study. Chi-square statistics were used to determine the effect of the predictors: demographic characteristics, entry grade and Final Grade Point Average (FGPA) on the dependent variable (LE performance). The study revealed a relationship between gender and LE performance, residential status, entry grade and students' FGPA at the college. However, no significant relationship was found between the age of participants, subject background at high school and LE outcomes. We conclude that students' socio-demographic and academic characteristics such as gender, campus residential status, entry grade and FGPA influence the outcome of the final LE of RGN students. Consequently, priority should be given to applicants with high pre-entry aggregate during recruitment and on campus accommodation should be provided for all trainee nurses. Furthermore, weak students with low FGPA should be given special tuition before they are registered for the final LE to improve their outcomes.

Keywords: Academic Characteristics, Students' Demographic, Registered General, Ghana.

1. Introduction

A major challenge facing higher educational institutions around the world is how to achieve quality outcomes for students in an increasingly globalized and competitive environment (Harvey,

* Corresponding author

E-mail addresses: patience.doe@ucc.edu.gh (P. F. Doe), sarfojo@gmail.com (J. O. Sarfo)

Kamvounias, 2008). Nursing education has evolved over the years with the prime objective of providing high quality nursing education that produces well-educated and skilled nurses according to the needs and requirements of the dynamic growing Ghanaian society, as well as, meeting the demands of managing emerging diseases (Nurses and Midwives Council of Ghana, 2003). Mellish and colleagues indicate that nursing education is designed to educate and train nursing students to become competent and qualified professional nurses who have mastered certain skills and are knowledgeable about the science of nursing in order to provide skilled nursing care (Mellish, Brink, Paton, 2009). However, efforts at ensuring quality training of health personnel appears to be threatened by significant failure rates in Ghanaian nursing training institutions (Wilmot, Kumfo, Danso-Mensah, Antwi-Danso, 2013).

The RGN diploma programme is based on the semester and course unit system, and recruits graduates from the Senior High Schools. Applicants should obtain an aggregate of 30 or better in the West African Senior Secondary School Examination (WASSSE) or the Senior Secondary School Certificate Examination (SSSCE). Applicants could be either male or female between the ages of 18 and 35. The grades obtained by students in each semester during the period of training are converted into Grade Point Average (GPA) after which a Cumulative Grade Point Average (CGPA) is computed for each student at the end of the academic year. Upon completion of the six semester course, the students are registered to write the professional LE. A student should maintain a FGPA of 1.5 to qualify for registration to write the professional LE (Academic Unit, 2013).

A report by the Nursing and Midwifery Council of Ghana showed that out of the 2,178 candidates presented for the RGN LE in 2011, only 823 representing 37.7 % passed, whilst the bulk of the candidates (1,355) representing 62.2 % were referred (Bonney, 2011). Beaumont-Walters and Soyibo (1998) argued that many factors influence student performance, either directly or indirectly. Ali, Zubair, Munir, Khan and Ahmed (2013) reported that gender, age, teaching faculty, students schooling, guardians' social economic status, residential area of students, medium of instructions in schools, tuition trend, daily study hour and campus residency influenced students' academic performance.

Even though, a number of studies have reported age as the strongest demographic predictor of academic success in nursing courses (Kostecki, Bers, 2008; Timer, Clauson, 2010), Ali (2008) found that there was no association between age and academic performance among nursing diploma students. He indicated that candidates, regardless of their ages, may apply for admission and perform well in the general nursing diploma programme. Mulholland, Anionwu, Atkins, Tappern and Franks (2008) also reported that academic performance is mostly determined by the gender differences among students, with males being predominantly superior to females. However, a related study showed that female nursing students performed better academically than their male colleagues (Ali, 2008). Haas, Nugent and Rule (2004) explained that student factors like pre-entry qualifications is vital to academic performance. They emphasized that identifying and recruiting students who are most likely to succeed in the nursing programmes should be an important admission criterion for entering into the nursing profession.

Furthermore, academic performance is likely to be high if admission points are high and vice versa (Giddens, Gloeckner, 2005). Studies supporting this argument reported that the previous academic performance of students affect future academic performance (Bratti, Staffolani, 2002; Geiser, Santelices, 2007; McManus, Smithers, Partridge, Keeling, Fleming, 2003). Thus, this is an effective admission criterion which helps in selecting not only the suitable candidates, but also in identifying students who are at a risk of failure (Ali, 2008). Studies reporting on the influence of subject background on academic performance also found that, students with better grades in their pre-university examinations showed better performance in their examinations, regardless of the science subjects they took at the pre-university level (Jeffreys, 2007; Radhakrishnan, Nagarajah, Young, 2012; Newton, Smith, Moore, Magnan, 2007).

The relationship of science courses and successful completion of nursing school has also been cited in multiple literature (Moseley, Mead, 2008; Roncoli, Lisanti, Falcone, 2000; Woodfield, Earl-Novell, 2006). In addition, Students' GPA has been identified as a predictor of NCLEX-RN failure. A study showed that students who did not pass NCLEX-RN on the first attempt exhibited lower GPAs as compared to those who passed the NCLEX-RN (Beeson, Kissling, 2001). Previous studies on predictors of nursing students' success frequently found that higher GPAs are positively correlated with academic success in nursing educational programmes (Jeffreys, 2007; McManus et

al., 2003; Radhakrishnan et al., 2012). Several studies have examined the influence of student socio-demographic characteristics on academic performance. However, these studies frequently ignore the possibility that different groups of students are differently affected by these variables. Besides, significant components of literature focused on mainly inter semester performance of students overlooking the influence of these variables on the final nursing professional LE.

This study is pertinent in identifying specific socio-demographic and academic factors associated with nurse trainee poor performance in the final LE. The RGN LE results of students in Ghana under study have been declining over the past six years. An analysis of the results of the students revealed that, the pass rate of the institution dropped significantly from 82.1 % in 2007 to 28.9 % in 2011. Moreover, majority (71.1 %) of students presented for 2012 professional LE failed (Beaumont-Walters, Soyibo, 1998). Although there have been three major consecutive decline in performances of nursing LE nationwide between 2009 and 2011 in Ghana, few studies have examined the contributing factors of such a high failure rates. Studies conducted did not determine the influence of students' socio-demographic background and academic factors on performance in the LE. Furthermore, no study has been conducted at the institution under study. There is therefore little scientific data that explains why nursing student performs poorly in the LE in Ghana. The main purpose of this study is to statistically validate the influences of specific socio-demographic characteristics of student nurses, as well as the influence of academic factors such as subject background, pre-entry aggregates and FGPA on licensure performance.

2. Methods

Design and Sampling

The retrospective, descriptive study design was used to frame the study. The study collected administrative data to assess the influence of students' socio-demographic characteristics as well as students' GPA/FGPA on LE outcomes. The academic records of 324 students admitted between 2007 and 2012 who wrote the RGN LE conducted between 2007 and 2012 were reviewed using data extraction sheets. A stratified sampling method was used to select 324 student records from the institution's Academic Unit. A proportional allocation was used to select records from each year group. Data on students' GPA, socio-demographic characteristics and students' performance pertinent to this study was also obtained from the Academic Unit. The relationship between students' performance in LE and selected factors were examined using frequencies, correlations, and chi-squares.

Ethical Consideration

The study complied with all the prescriptions for doing research with human samples and related human data. In addition, institutional permission was obtained while the identity of the students and their records were anonymised, protected and kept confidential.

Data processing and Analysis

Statistical Package for the Social Sciences and Microsoft Excel tools were used to process and analyse data that were collected from students' files and records. Bivariate descriptive statistics of cross tabulation and chi-square test at 95 % confidence interval, $p < 0.05$ which was considered statistically significant were used to identify the relationship between the dependent variable (academic performance) and the predictor variables (demographic characteristics, student subject background, student WASSCE/SSSCE performance and semester performance). This statistical technique was used because it helped in exploring the linear and multiple relationships between the predictor variables.

3. Results

The result in Table 1 showed that, 3 out of 5 students were aged 20 years or below (62 %). Female subjects represented 65 %. Other socio-demographic characteristics of respondents included 64.8 % residential students compared to 35 % non-residential students.

Table 1. Background characteristics of subjects

Parameters	Frequency	Percentage (%)	Mean±S.E
Age categories			1.359±0.0308
20 years & below	205	63.3	
21-25 years	112	34.6	
26-30 years	5	1.5	
31-35 years	2	0.6	
Gender			1.648±0.0266
Male	114	35.2	
Female	210	64.8	
Occupation of guardian			1.534±0.0278
Government worker	151	46.6	
Self employed	173	53.4	
Residential status			1.352±0.0270
Resident	210	64.8	
Non-resident	114	35.2	
Total	324		

The study revealed that 3 out of 5 students (63.3 %) aged 20 or below obtained 64.9 % pass rate in the LE, whilst 35.1 % were referred. More than half (58 %) of students aged between 21 and 25 years passed the LE at their first attempt. The results showed that there was no significant association between age categories and performance in the LE at 0.05 confidence level ($\chi^2= 4.744$, $p= 0.19$). The table also showed that female students formed the majority (64.8 %) of nursing students. Among those who failed, almost 5 out of 10 (47.4 %) male students failed the LE at their first attempt, compared to 3 out of 10 (32.9 %) female students. The chi-square statistics showed that more females students passed the licensure exams at the first attempt compared to males ($\chi^2= 6.601$, $p= 0.010$).

In addition, 3 out of 10 (31.9 %) resident students failed the LE at first sitting while almost half (49.1 %) non-resident students failed at first sitting. Chi-square statistics showed that campus residence facilitates good performance in LE. The result was significant at 5 % ($\chi^2= 9.301$, $p= 0.002$).

Table 2. Demographic characteristics and LE outcome

Parameter	Pass (%)	Fail (%)	Total (%)	χ^2	P- value
Age					
20 years and below	133(64.9)	72(35.1)	205(63.3)	4.744	0.19
21-25 years	65(58)	47(42)	112(34.6)		
26-30 years	3(60)	2(40)	5(1.5)		
31-35 years	0(0)	2(100)	2(0.6)		
Total	201(62)	123(38)	324(100)		

Gender					
Male	60(52.6)	54(47.4)	114(35.2)	6.601	0.010
Female	141(67.1)	69(32.9)	210(64.8)		
Total	201(62)	123(38)	324(100)		
Occupation of guardian					
Government workers	96(63.6)	55(36.4)	151(46.6)	0.284	0.594
Self employed	105(60.7)	68(39.3)	173(53.4)		
Total	201(62)	123(38)	324(100)		
Residential status					
Residence	143(68.1)	67(31.9)	210(64.8)	9.301	0.002
Non residence	58(50.9)	56(49.1)	114(35.2)		
Total	201(62)	123(38)	324(100)		

The study further showed that guardian occupation does not have any influence on LE performance ($\chi^2 = 0.284$, $p = 0.594$). Only 36 % of students whose guardians were government workers failed whilst 39 % of students with guardians who were self-employed failed the LE.

Table 3. Effects of subject background on LE outcome

Subject background	Pass (%)	Fail (%)	Total (%)	χ^2	P-value
General science	105(68.2)	49(31.8)	154(47.5)	5.467	0.141
General agriculture	5(50)	5(50)	10(3.1)		
General arts	88(56.4)	68(43.6)	156(48.1)		
Home economics	3(75)	1(25)	4(1.2)		
Total	201(62)	123(38)	324(100)		

The research further revealed that 7 in 10 (68 %) of the students who offered General Science at the Senior Secondary School passed the LE whilst 3 in 10 (31.8 %) failed. Less than half (47.5 %) of students with science background passed the examination at first attempt. Less than half (48.1 %) of the students with general arts background also passed. Chi-square statistics indicated that, there was no significant association between subject background and LE outcome ($p = 0.141$).

Table 4. Effects of entry aggregate on LE outcome

Entry aggregate	Pass (%)	Fail (%)	Total (%)	χ^2	P-value
11-14	10(76.9)	3(23.1)	13(4.0)	11.469	0.003
15-19	87(72.5)	33(27.5)	120(37)		
20-24	104(54.4)	87(45.5)	191(59)		
Total	201(62)	123(38)	324(100)		

The research result in [Table 4](#) also showed that more than 2 out of 10 (45.5 %) of students with entry aggregate between 20–24 failed LE at the first sitting. Majority (76.9 %) of students with entry aggregate of 11-14 passed the examination at the first sitting. Chi-square statistics showed that the higher students' grade point, the better their performance in the LE ($p = 0.010$).

Table 5. Effects of final GPA on LE outcome

Final grade point	Pass (%)	Fail (%)	Total (%)	χ^2	P-value
3.6-4.0	19(95)	1(5)	20(6.2)	44.459	0.0001
3.0-3.5	81(77.1)	24(22.9)	105(32.4)		
2.5-2.9	84(58.7)	59(41.3)	143(44.1)		
2.0-2.4	16((32)	34(68)	50(15.4)		
1.5-1.9	1(16.7)	5(83.3)	6(1.9)		
Total	201(62)	123(38)	324(100)		

The result revealed that Licensure performance was significantly associated with FGPA ($p= 0.0001$). Majority (95 %) of students with FGPA between 3.6–4.0 passed the LE. Licensure failure rates also increased from 5 % to 83 % for students with FGPA ranging between 1.5–1.9 respectively as shown in [Table 5](#).

Table 6. Effects of size of class on LE outcome

Year Group	Total no. of candidates Presented	Pass (%)	Fail (%)
2007	39	82.1	17.9
2008	95	56.8	43.2
2009	84	65.5	34.5
2010	54	57.4	42.6
2011	90	28.9	71.1
2012	71	87	13
Total	433	60	40

The research further demonstrated that most of the smaller year groups presented for the LE had better pass rates compared to the larger year groups. For instance, in 2007 where only 39 students were presented for the LE, only 17.9 % failed at first sitting. Meanwhile in 2011, 7 out 10 students (71.1 %) failed the LE when 90 students were presented for the LE.

4. Discussion

This study revealed that gender, campus residency, pre-nursing school aggregate, GPA and FGPA of student nurses were the major factors associated with performance in the nursing professional LE. The study showed that female nursing students perform better at 67.1 % in LE than their male counterparts at 52.6 %. These results are in agreement with other studies that found that female students had higher rates of course success than male students in nursing schools ([Mulholland et al., 2008](#)). Such performance could be attributed to the assiduous nature of female students as well as institutional, governmental and public encouragement on education female educations ([Newton et al., 2007](#)). There was significant relationship between sex and licensure performance. Female students passed the licensure exams at the first attempt compared to males.

The result showed a decrease in the LE pass the rate from 64.9 % for students aged 20 or below to 58 % for students aged 21-25. No students aged 31 between 35 passed the LE at first attempt. This finding could be explained by the fact that, younger students may have lesser stressors and free from certain responsibilities and such are able to concentrate on their academic work. However, there was no significant relationship between age and licensure performance. The findings are consistent with the report of Ali (2008) who reported that there was no association between age and academic performance among nursing diploma students and that

candidates regardless of their age may apply for admission and perform well in the general nursing diploma programme.

Only 31.9 % resident students failed the LE at first sitting while almost half (49.1 %) non-resident students failed at first sitting. Chi-square statistics showed that staying on campus was associated with good performance in licensure exams. The findings also showed that most of the students (64.8 %) were not resident on campus. Previous research suggested that living on campus promotes a variety of desirable academic outcomes by enhancing student's involvement and engagement with their institutions and academic work (Ali, 2008; Ali et al., 2013). The result of this study confirmed the strong association between nursing LE outcome and residential status of diploma nurses. Such association could be attributed to social interactions such as forming of discussion groups between peers and extracurricular activities which enhance students' critical thinking and reading abilities. Thus, students become actively involved in academic activities which make them take more responsibility for their studies rather than receiving passive information.

Additionally, the research result revealed that 45.5 % of students with entry aggregate between 20 and 24 failed LE at the first attempt. On the contrary, majority (76.9 %) with entry aggregate of 11-14 passed the examination at the first sitting. Chi-square statistics indicates that the higher grade point a student attains the better performance he or she achieves the LE. The study has found association between grades obtained in the WASSSE/SSSCE and performance in the LE. These findings are congruent with several research findings which have suggested that pre-entry qualification is an important criterion for success in nursing schools (Geiser, Santelices, 2007; Giddens, Gloeckner, 2005; Haas et al., 2004). This could be explained by the assertion that previous performance affects future performance and that if admission grade points are high, then the academic performance is likely to be high and vice versa. We conclude that, students' individual ability and motivation is influenced by previous academic success.

Studies in the past had reported that students who offered science courses in the second cycle institution performed better in the nursing programme compared to students who offered other courses secondary school (Jeffreys, 2007; Newton et al., 2007; Roncoli et al., 2000). Contrary to these previous research findings, the results of this study disclosed that there is no significant association between subject backgrounds on nursing licensure performance outcome. Student nurses could achieve better academic outcomes regardless of their subject area in the senior high school. This finding could be due to individual motivation, self-efficacy and student learning styles.

The results again revealed that the higher GPA a student obtains, the better his or her LE performance. Performance in the LE seems to increase with increase in final grade point. There was positive relationship between final grade point of students and LE outcome at 0.05 confidence level. The study revealed that, only 5 % of students with FGPA between 3.6 and 4.0 failed the LE whilst majority of students (83 %) with FGPA of 1.5 to 1.9 failed the examination at the first attempt. This result supported findings which reported that higher GPAs were positively correlated with academic success in nursing courses or programmes (McManus, Smithers, Partridge, Keeling, Fleming, 2003; Radhakrishnan, Nagarajah, Young, 2012) and that even slight changes in CGPA were significant to predict the successes between student who would pass or fail LE (Landry, Davis, Alameida, Prive, & Renwanz-Boyle, 2010; Pitt, Powis, Levett-Jones, Hunter, 2012; Tipton et al., 2008).

The result further demonstrated that; poor licensure performance is associated with larger class sizes. The association of large class size with failure in the LE could be due to inadequate text books, library space, overcrowding in classrooms and poor student - tutor ratio (Babcock, Bedard, Schulte, 2012; Graue, Hatch, Rao, Oen, 2007; Konstantopoulos, Sun, 2014; Sohn, 2016). These factors could be impacting negatively on the teaching-learning process.

5. Conclusions and Recommendations

The study revealed that, female nurse trainees' performed better in LE than their male counterparts. The results also confirmed strong association between LE outcome and campus residential status students. Students with higher pre-entry and final grade points tend to perform better than their counterparts with lower points in the LE. The final grade point of trainee nurses is also a strong predictor of success in the professional LE.

Based on the findings of this study, we conclude that certain student socio-demographic and academic characteristics whilst in training affect the nurse trainees' final LE outcome. In order to improve upon the licensing pass rate there is the need to review the entry behaviour of students to select applicants who are most likely to perform academically. The teaching and learning methodologies and school environment should be modified to improve student FGPA before they are registered for the professional LE.

We recommend that, policy makers and other stakeholders in nursing education should enforce specific policies and protocols to select applicants with high pre-entry aggregate during student recruitment for training.

6. Conflicts of Interest

The authors declare the work has no conflicts of interest.

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