Original Article

Relationship of academic courses and clinical internships to performance on the National Qualified Examination for Registered Professional Nurses (NQEX-RPN)

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ARTICLE INFO

Article history:
Received 28 July 2014
Received in revised form 15 October 2014
Accepted 24 October 2014
Available online 13 November 2014

Keywords:
Nursing baccalaureate
Education
National Qualified Examination for Registered Professional Nurses
Regress analysis

ABSTRACT

Background: Success in the National Qualified Examination for Registered Professional Nurses (NQEX-RPN) is a critical issue for each nursing student and every nursing school. However, to date, little research has been conducted regarding the degree of risk for licensure failure associated with specific academic courses and clinical internships in Mainland China.

Objective: This study aimed to explore the relationship of academic courses and clinical internships to performance on the NQEX-RPN in Mainland China.

Methods: This was a retrospective descriptive study. Two hundred twenty-eight new graduates were recruited from a four-year baccalaureate nursing program in Mainland China. The scores of academic courses and clinical internships were recorded from the Teaching and Learning administration of the university. The NQEX-RPN performance data was collected from the Provincial Health Department. Personal information was collected from the participants. Multiple stepwise regression was used to identify predictors of the NQEX-RPN.

Results: Twenty-three courses and four clinical internships were positively associated with NQEX-RPN performance. Surgical nursing, Medical nursing, Computer basics and Community health care explained the 36.2% of the total variance of Theoretical Knowledge ($F = 31.313$, $p = 0.000$); clinical internships of obstetrics and gynecology nursing, pediatrics and surgical nursing explained the 28.1% of the total variance of Application Skills ($F = 28.852$, $p = 0.000$).

Conclusion: Surgical-medicine nursing, Community health care, Computer basics and clinical internships are beneficial in assisting students and educators to identify the risk of students’ performance in the NQEX-RPN.

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Peer review under responsibility of Chinese Nursing Association.
http://dx.doi.org/10.1016/j.jnss.2014.10.002
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1. Introduction

A recognized qualification is required before nurses can be registered and practice legally. The NQEX-RPN performance is an admission criterion in most countries. Success in the NQEX-RPN is therefore an initial goal of graduation among nursing students. The NQEX-RPN is also regarded as an indicator of the quality of nursing education programs. High pass rates on the examination promote nursing schools’ reputation, maintain accreditation, attract new students, and provide safe care for the public [1]. Passing the NQEX-RPN is now becoming a critical issue for each nursing student and every nursing school.

Numerous studies overseas have been conducted to identify nursing students who are at risk for the National Council Licensure Examination-Registered Nurses (NCLEX-RN) failure as early as possible so that remediation can be promptly initiated. These studies have found academic predictors including in high school rank, Scholastic Aptitude Test (SAT) scores, American College Test (ACT) scores, entering grade point average (GPA), freshman and pre-nursing GPA, nursing GPA, GPA upon graduation, achievement in specific nursing courses, course grade scores, Mosby Assess Test (MAT) scores, National League for Nursing Achievement Test (NLNA) scores, and Watson–Glaser Critical Thinking Appraisal (WGCTA) scores [2–4]. Among these influential factors, academic courses are one of the most significant study focuses. Different courses have been found to be related to the licensure exams due to curriculum differences among countries or areas. Lin et al. (2003) have reported that the scores of nine courses were weakly associated with the NQEX-RPN in a two-year associate nursing program in Taiwan, including Nursing II, Physiology Laboratory, Physiology, Pediatric Nursing, Physical Assessment, Public Health Nursing, Pathology, Physical Assessment Laboratory, Obstetric Nursing, Chemistry I, Official Document Writing in Chinese and Chemistry II [5]. Emory (2013) has indicated that the pharmacology assessment score was predictive with 73.7% accuracy of the NCLEX-RN performance in a baccalaureate nursing program in Fayetteville [6]. These studies imply that some specific courses can assist in early identification of at-risk students of the licensure failure. However, to date, no research has been conducted regarding the degree of risk for licensure failure associated with specific courses and clinical intern practices in mainland China.

In mainland China, the NQEX-RPN has been the only official licensure exam since the 1990s. Applicants since 2009 for the NQEX-RPN should meet the following requirements: formal nursing education from Secondary Technical Nursing Schools or higher nursing colleges accepted by the Ministry of Education; and at least eight months of clinical internships in teaching or general hospitals. The NQEX-RPN consists of two parts, Theoretical Knowledge and Application Skills. Each part ranges from 120 to 160 questions with one point for each question. It heavily relies on single choice questions including type A1, A2, A3 and A4. The questions are designed to assess examinees’ abilities to understand, analyze, evaluate and apply nursing knowledge and skills. The minimum pass mark is determined on the basis of the number of examinees and exam results each year. Very few local studies have sought to explore predictors of the NQEX-RPN performance in specific programs. A retrospective study by Su and Hu (2001) has showed that nurses’ NQEX-RPN performance is significantly related to independent learning programs, admission scores of English and biology, and academic scores of English and fundamental nursing [7]. The cross-sectional survey from Su et al. (2010) has found that education background, grades of practicing hospitals, and efforts made to review for the exam are significantly correlated with the NQEX-RPN performance [8]. These previous studies are limited to nursing students or nurses among secondary technical nursing programs and associated-degree nursing programs, while predictors of baccalaureate nursing graduates’ NQEX-RPN performance are not clear. In addition, the studies have not included for all specific academic courses and clinical internships as factors to predict NQEX-RPN performance.

1.1. Purpose

The purpose of this study was to explore the relationship of academic courses and clinical internships to the NQEX-RPN performance in a Chinese four-year baccalaureate nursing program.

2. Methods

2.1. Design

This was a retrospective descriptive study.

2.2. Sample

Two hundred twenty-eight new graduates were recruited for this study from a provincial, public four-year baccalaureate nursing program in the southeast of China. Inclusive criteria for the participants were: (a) completion of the baccalaureate nursing program and (b) the first attempt of the NQEX-RPN in 2012. The exclusive criterion was failure to advance to the next grade as planned during the program.

2.3. Data collection

Ethical approval was obtained from the university’s research ethics committee. The purpose of the study, the participants’ right to withdraw from the study, and their right to maintain privacy and confidentiality were fully disclosed. When their informed consent was obtained verbally, a questionnaire with personal information, academic scores, and NQEX-RPN performance was employed to collect data. Personal information was collected from the participants by the second author. The academic scores of all courses and clinical internships were recorded from the Teaching and Learning Administration of the university by the third author. The NQEX-RPN performance was copied from Fujian Provincial Health Department by the third author.

The data were analyzed with the Statistical Package for the Social Sciences version 15.0. Multiple stepwise regression was used to explore the predictors of the NQEX-RPN. The
dependent variables were Theoretical Knowledge ($Y_1$) and Application Skills ($Y_2$). The independent variables were each academic course and internship in each clinical department ($X_i$). They were all continuous interval variables. All statistical tests were conducted at $\alpha = 0.05$ level of significance.

3. Results

The mean age of 228 students was 23.0 ± 1.03 years, ranging from 21 to 28 years. 89.9% of them were female ($n = 205$).

In 2012, the minimum pass mark of the NQEX-RPN was 80 out of 136 for professional practice and 80 out of 137 for practical ability. In this study, the average score of Practice Theoretical Knowledge was 111.35 ± 5.11, ranging from 97 to 125; and that of Application Skills was 114.08 ± 6.29, ranging from 90 to 129. All participants passed the NQEX-RPN.

Thirty-two courses were included in this study. Twenty-three of them were significantly associated with the NQEX-RPN performance, including one common course ($r = 0.178 – 0.218$, $p < 0.01$), nine pre-nursing courses ($r = 0.163 – 0.589$, $p < 0.01$), three fundamental nursing courses ($r = 0.259 – 0.425$, $p < 0.01$) and ten advanced nursing courses ($r = 0.162 – 0.351$, $p < 0.01$). The internships in nine clinical departments were significantly associated with Theoretical Knowledge ($r = 0.147 – 0.423$, $p < 0.01$); and those in four departments were significantly related to Application Skills ($r = 0.291 – 0.391$, $p < 0.01$) (Table 1).

Regarding predictors of Theoretical knowledge, four academic courses were found to enter into the multiple stepwise regression equation $Y_1 = 46.446 + 0.326X_1 + 0.269X_2 + 0.117X_3 + 0.131X_4 (F = 31.313, p = 0.000)$ (Table 2): Surgical Nursing, Medical Nursing, Computer Basics, and Community Health Care. These courses explained 36.2% of the total variance of Theoretical Knowledge. Furthermore, obstetrics and gynecology nursing internships, pediatrics nursing internships, and surgical nursing internships were identified as predictors of Application Skills. The multiple stepwise regression equation for Application Skills was $Y_2 = 44.744 + 0.367X_9 + 0.136X_4 + 0.321X_7 (F = 28.852, p = 0.000)$ (Table 3). The internships explained 28.1% of the total variance of Application Skills.

4. Discussion

Students’ risk of failure on the NCLEX-RN is an ongoing problem. Various western studies have reported a low pass rate for the nurse licensure exam. For example, the National Council of State Boards of Nursing (NCSBN) recently has declared that the national failing NCLEX-RN rate in 2013 was approximately 16.96% among 155,098 first-attempt US-educated baccalaureate nursing students [9]. In contrast, this study has found that the pass rate of the NQEX-RPN was 100% in 2012. One possible reason is that the students in this study were recruited from a four-year full-time baccalaureate nursing program, where nursing knowledge and skills are much better than those received in a two- or three-year nursing education program. Another reason may be that four students who failed to advance annually were excluded from this study. In spite of these reasons, these findings indicate that it is possible for all student nurses to pass the NCLEX-RN on their first attempt. Indeed, it is not a surprise to find a 100% pass rate of the NCLEX-RN in baccalaureate nursing graduates in mainland China over the past years, which indicates that Chinese full-time baccalaureate nursing education is successful in cultivating qualified nurses.

Twenty-three of thirty-two academic courses in this study were found to be positively related to the NQEX-RPN performance. Advanced nursing courses were most strongly associated with the NQEX-RPN, followed by fundamental nursing courses, pre-nursing courses and common courses. As Lin et al. (2003) reported, nursing courses should be most important in making significant contributions to the NQEX-RPN performance [5]. Students who got high scores in nursing courses generally got high scores on the NQEX-RPN.

This study has revealed a slightly different picture about predictors of the NQEX-RPN. Four academic courses were identified as predictors of Theoretical Knowledge, including Surgical Nursing, Medical Nursing, Computer Basics, and Community Health Care. Similarly, Yeom’s investigation (2013) revealed that Adult, Medical–Surgical, Pharmacology, and Community Health standardized tests were effective in predicting NCLEX-RN success on the first attempt among graduates from the traditional baccalaureate nursing program of a public university [10]. Recently, Schooley and Kuhn (2014) have reported that Pediatric Nursing, Medical-Surgical Nursing and Maternity Nursing course grades were found most significantly influential on the NCLEX-RN [11]. It may be due to different nursing curriculum designs and NQEX-RN formats. It is worth mentioning that a computer course was found be a key predictor of the NQEX-RPN performance in this study. It may because this course enables students to take advantage of various on-line learning resources. Extensive literature reading is an effective approach to understanding and applying nursing knowledge and skills [12,13].

This study has also found that the internships in nine clinical departments are significantly associated with Application Skills, particularly in obstetrics and gynecology nursing departments, pediatrics nursing departments and surgical nursing departments. This finding proved that a nursing internship is an essential component of a baccalaureate nursing program. The nursing internship increases students’ confidence in performing nursing tasks and in interacting with patients and families [14]. Importantly, nursing educators should facilitate a successful internship, which includes coordinating with teaching hospitals, clarifying guidelines of nursing internship, empowering clinical instructors, outlining clinical teaching methods, and managing media for teaching and learning. Fortunately, China has vast clinical teaching resources. Baccalaureate nursing students are provided with a large number of opportunities to apply knowledge and skills into clinical practices under the supervision of their instructors. The students are required to pass the exit examination of one clinical department before shifting to another. The instructors’ clinical teaching skills are evaluated by students during and immediately after the internship [15]. The feedback goes back to nursing educators in order to coordinate clinical teaching and learning. In a word, Chinese nursing educators have made great efforts to improve the quality of clinical internships.
5. Conclusion and recommendation

This is a pioneer study in China to explore the relationship between academic courses, clinical internships, and the NQEX-RPN performance. This study has indicated predictors of the NQEX-RPN performance includes participation in four academic courses and three clinical internship departments. The findings provide references for nursing educators to improve educational strategies and enhance student performance.

Table 2 – Predictors of nursing graduates’ Theoretical Knowledge.

<table>
<thead>
<tr>
<th>School subjects</th>
<th>B</th>
<th>Std. Error</th>
<th>Beta</th>
<th>t</th>
<th>Sig.</th>
<th>95% confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>Constant</td>
<td>46.446</td>
<td>6.604</td>
<td>7.033</td>
<td>0.000</td>
<td>33.432</td>
<td>59.460</td>
</tr>
<tr>
<td>Surgical nursing (X₁)</td>
<td>0.326</td>
<td>0.066</td>
<td>0.334</td>
<td>4.964</td>
<td>0.000</td>
<td>0.196</td>
</tr>
<tr>
<td>Medical nursing (X₂)</td>
<td>0.269</td>
<td>0.087</td>
<td>0.205</td>
<td>3.075</td>
<td>0.002</td>
<td>0.097</td>
</tr>
<tr>
<td>Computer basics (X₃)</td>
<td>0.117</td>
<td>0.043</td>
<td>0.148</td>
<td>2.725</td>
<td>0.007</td>
<td>0.032</td>
</tr>
<tr>
<td>Community health care (X₄)</td>
<td>0.131</td>
<td>0.055</td>
<td>0.145</td>
<td>2.361</td>
<td>0.019</td>
<td>0.022</td>
</tr>
</tbody>
</table>

*p < 0.05; **p < 0.01.
identify students at risk of failure of the NQEX-RN, to provide early remediation, to adjust nursing curricula, and to arrange clinical internships. The results can also serve as a starting point to lead nursing students to better prepare for the NQEX-RPN. However, this study was limited because of participant recruitment, taking place in only one Chinese nursing college, rendering impossible the generalization of the study findings to the whole population of China-educated new baccalaureate graduates. To confirm the predictors of the NQEX-RPN performance, we recommend that a multi-center survey be conducted on a large sample from various Chinese nursing schools. Moreover, we suggest that future studies employ GPA as an outcome measurement of academic performance, since the credit system has been adopted widely in Chinese nursing colleges.

REFERENCES