

**FACTORS INFLUENCING NURSING STUDENT ACADEMIC SUCCESS: A  
MIXED METHODS STUDY**

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of the Requirements for the Degree  
Doctor of Philosophy

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## Table of Contents

Acknowledgements .....	ii
<i>List of Tables</i> .....	<i>vii</i>
<i>List of Figures</i> .....	<i>viii</i>
Abstract .....	ix
<i>Organization of the Dissertation</i> .....	<i>xi</i>
<i>Chapter 1: Introduction</i> .....	<i>1</i>
Economic and Political Context of Nursing Education in Oman .....	1
Geography and Demography of the Sultanate of Oman .....	1
English Language in Higher Education .....	1
General Foundation Program .....	2
Nursing Workforce in Oman: Challenges and Aspirations .....	3
References .....	7
<i>Chapter 2: Literature Review</i> .....	<i>9</i>
Systematic Review of Program Evaluation in Baccalaureate Nursing Programs .....	10
Abstract .....	10
Introduction .....	11
Methods .....	13
Results .....	14
Discussion .....	27
Conclusions .....	34
References .....	36
Systematic Review: Predictors of Students’ Success in Baccalaureate Nursing Programs .....	43
Abstract .....	43
Introduction .....	44
Method .....	47
Results .....	48
Discussion .....	55
Conclusions .....	60
References .....	62
Educational Environment and Student Success .....	67
Factors Related to Student Success .....	67
Reference .....	69
<i>Chapter 3: Research Design and Methods</i> .....	<i>71</i>
Purpose .....	71
Specific Aims and Research Questions .....	71
Significance of the Study .....	73
Theoretical Framework .....	73

Measures .....	75
Glossary Terms .....	76
Study Setting .....	78
Sampling .....	79
Data Collection .....	82
Data Analysis .....	86
Ethical Considerations .....	91
Quality of Mixed Methods Study .....	92
Mixed-Method Integration .....	93
References .....	95
<i>Chapter 4: Results</i> .....	98
Predictors of Nursing Student Success at the Oman College of Health and Sciences .....	99
Abstract .....	99
Background .....	100
Literature Review .....	100
Methods .....	106
Results .....	110
Discussion .....	122
Conclusion .....	126
Implications .....	127
References .....	128
Factors influencing nursing student academic success: A mixed methods study .....	134
Abstract .....	134
Background .....	135
Methods .....	137
Results .....	143
Discussion .....	157
Conclusion .....	161
References .....	163
<i>Chapter 5</i> .....	169
Key Findings, Discussion, Conclusion, and Recommendations .....	169
Summary of Key Findings .....	171
Discussion .....	174
Conclusion .....	179
Recommendations .....	183
References .....	186
<i>Comprehensive Reference List</i> .....	189
<i>Appendix A</i> .....	207
<i>Copyright Clearance to Use Literature Review Manuscripts</i> .....	207
<i>Appendix B</i> .....	209
<i>Appendix C Interview Guide</i> .....	215
<i>Appendix D: Informed Consent</i> .....	217

*Appendix E: Permission to Use the UNSASS* ..... 221  
*Vita* ..... 223

## List of Tables

<b>TABLE 1.1</b> LEVELS OF ENGLISH OFFERED AT THE GFP WITH THE CORRESPONDING TEST SCORES ON THE PLACEMENT TEST .....	3
<b>TABLE 2.1</b> QUALITY ASSESSMENT CRITERIA FOR EVALUATING PRIMARY RESEARCH PAPERS .....	16
<b>TABLE 2.2</b> COMMON INDICATORS EXAMINED IN THE LITERATURE REVIEW .....	23
<b>TABLE 4.1</b> DESCRIPTIVE STATISTICS AND VARIABLES DEFINITIONS .....	111
<b>TABLE 4.2</b> PREDICTING STUDENT SUCCESS WITH PRE-ADMISSION CRITERIA .....	113
<b>TABLE 4.3</b> PREDICTING STUDENT SUCCESS WITH DEMOGRAPHIC VARIABLES .....	115
<b>TABLE 4.4</b> PREDICTING STUDENT SUCCESS WITH GPA OF ENGLISH LEVEL-3 SCORE .....	116
<b>TABLE 4.5</b> PREDICTING STUDENT WITH ACADEMIC AND NON-ACADEMIC VARIABLES .....	116
<b>TABLE 4.6</b> PREDICTING STUDENT SUCCESS EXCLUDING ENGLISH LEVEL-3 .....	118
<b>TABLE 4.7</b> PREDICTING STUDENT SUCCESS BY CAMPUS AFFILIATION .....	120
<b>TABLE 4.8</b> CHARACTERISTICS OF STUDENT POPULATION PER CAMPUS .....	121
<b>TABLE 4.9</b> DESCRIPTIVE DATA OF SURVEY RESPONSES .....	144
<b>TABLE 4.10</b> MEAN SATISFACTION RATE ACROSS CAMPUSES .....	145
<b>TABLE 4.11</b> THE FIVE GREATEST AND LOWEST-RATED ITEMS IN THE SURVEY .....	146
<b>TABLE 4.12</b> CORRELATION OF STUDENT SATISFACTION AND GRADUATING GPA .....	147
<b>TABLE 4.13</b> STUDENT SATISFACTION AND HISTORY OF FAILURE .....	147



## List of Figures

<b>FIGURE 2.1</b> PRISMA DIAGRAM .....	16
<b>FIGURE 2.2</b> PRISMA DIAGRAM .....	50
<b>FIGURE 3.1</b> THE INPUT-ENVIRONMENT- OUTPUT (I-E-O) MODEL .....	74
<b>FIGURE 3.2</b> THE SAMPLE-SELECTION PROCESS .....	80
<b>FIGURE 4.1</b> THE INPUT-ENVIRONMENT-OUTCOME (I-E-O) MODEL .....	104
<b>FIGURE 4.2</b> THE PROCESS OF SAMPLE IDENTIFICATION AND SELECTION .....	110
<b>FIGURE 4.3</b> STUDENT TRAJECTORY ACROSS ALL CAMPUSES .....	120
<b>FIGURE 4.4</b> MEAN SATISFACTION ACROSS CAMPUSES .....	145
<b>FIGURE 4.5</b> RESULTS FROM THE QUANTITATIVE & QUALITATIVE STRANDS: FACTORS INFLUENCING NURSING STUDENT SUCCESS AT OCHS IN ACCORDANCE TO INPUT-ENVIRONMENT-OUTCOME MODEL .....	149

## **Factors Influencing Nursing Student Academic Success: A Mixed Methods Study**

### **Abstract**

Student success is a core indicator of program effectiveness in nursing education. Student failure or delay in progression burdens the already limited educational resources, financially taxes the students and educational institution, and hinders an effective response to the growing demand for more nurses in health care settings. Recognizing influential factors of academic success or failure can inform academic support interventions. This sequential mixed-methods study examined factors that influence student academic outcomes at Oman College of Health Sciences by focusing on the relationship among student input, the academic environment, and student outcomes. In the first phase 267 students' academic records from seven satellite campuses were analyzed using Pearson correlations and bivariate and multiple regression to identify predictors of student success, defined as the GPA at the end of each year in nursing. A survey was distributed to 372 graduates to assess their satisfaction with the quality of their educational environment. The second phase included 11 one-on-one interviews of graduates on their opinions of what factors affected their success in the nursing program. Findings showed that the current admission criteria were marginally predictive of subsequent academic achievement in nursing. Gender, living arrangements, and student scores on English level-3 courses were strong predictors of student success. With a response rate of 91.1%, nursing graduates were somewhat satisfied with the quality of their educational environments. Analysis revealed a positive correlation between graduates' mean satisfaction and their graduating GPAs. Findings from the qualitative phase resulted in four themes perceived by graduates to have influenced their academic success: (a) positive prenursing academic experience, (b) student motivation and a support system as a positive influence on academic engagement, (c) language difficulties

throughout the nursing program, and (d) a challenging program design and delivery.

Understanding interconnections among student input, educational environments, and student outcomes can inform a systemic approach to facilitating a positive learning experience and promoting student success.

*Keywords: Nursing students, preadmission criteria, academic success, student satisfaction, educational quality*

## **Organization of the Dissertation**

This dissertation is organized into five chapters. The first chapter provides an overview of nursing and higher education in Oman. It also describes the study context, the problem statement, the purpose of the study, and its significance. The second chapter presents the theoretical underpinning that guides the study and reviews prior research on program evaluation of baccalaureate nursing programs, student selection criteria, and the prediction of students' success in 4-year undergraduate programs. The literature is presented in two published manuscripts: (a) a systematic review on predictors of students' success in baccalaureate nursing programs and (b) a systematic review of program evaluation in baccalaureate nursing programs. The third chapter delineates the research method and describes the study analysis. The fourth chapter comprises two manuscripts on (a) factors influencing nursing student academic success, in a mixed-methods study, and (b) predictors of nursing student success at the Oman College of Health and Sciences. Both manuscripts present the results of the study. Finally, Chapter 5 presents a summary of all findings, discussion, conclusion, and recommendations.

# **Chapter 1**

## **Introduction**

### **Economic and Political Context of Nursing Education in Oman**

Prior to proceeding with the research proposal content, this section provides an overview of the economic and political contexts of nursing education and the nursing profession in Oman. This section will help the reader to understand the external factors that can influence nursing education and students. The highlights for this overview include English language usage in higher education, the General Foundation Program, and challenges and aspirations among the nursing workforce in Oman.

### **Geography and Demography of the Sultanate of Oman**

The Sultanate of Oman is an Arab and Muslim country located on the southeastern coast of the Arabian Peninsula. It is among the five countries forming the Gulf Cooperation Council (GCC), which includes the United Arab Emirates, Qatar, Bahrain, Saudi Arabia, and Kuwait. Oman is a relatively large country in comparison to its neighboring countries, with Oman boasting 309,500 square kilometers of land and 3,165 kilometers of coast. The capital of Oman is Muscat, and the country's official language is Arabic. According to a 2017 annual report, the population in Oman has reached 4,559,963, of whom 55.3% are native Omanis, and the remaining (44.7%) are non-Omanis (National Centre for Statistics and Information, 2018).

### **English Language in Higher Education**

Because of the emerging economy, globalizing technology, and international communication worldwide, English has become one of the most dominant languages worldwide. The international status of the English language and its global impact have pushed many

countries to adopt the language for international communication and as a medium of instruction in many higher education programs (Al-Mahrooqi & Denman, 2018). In Oman, the English language has a strong presence in both general education and higher education. In 1998, national policies were mandated to enforce the use of English through reform of the primary education system, in which English is now introduced as a second language starting from first grade, instead of in fourth grade (Al-Bakri, 2013). This reform of the primary system was intended to enhance students' competence in the use of the English language and ease students' transition to higher education institutions, especially for students who are admitted into English-language programs (Al-Mahrooqi & Denman, 2018).

Nonetheless, Al-Mahrooqi and Denman (2018) argued that the anticipated outcomes of this education reform have not been realized. In fact, the level of English proficiency among students admitted to higher education institutions continues to be a concern. Many students transition from secondary education to higher education with low English proficiency (White, 2012). As a result, students face a difficult transition to college English curricula because many students lack the study skills and English language proficiency to study in an English instructional program (Al-Mamari, 2012). In response to the challenges encountered by students and higher education institutions, a 1-year program called the General Foundation Program (GFP) was mandated in 2008–2009 (Al-Mamari, 2012).

### **General Foundation Program**

The General Foundation Program (GFP) is a formal, compulsory undergraduate prerequisite. The GFP follows a national framework designed by the Oman Academic Accreditation Authority to guide its implementation. Nonetheless, universities and colleges are provided with flexibility in assessing the program's outcomes (Al-Mamari, 2012). The program

is a 1-year (three-semester) program designed to prepare students for college-level education by offering intensive English courses, study skills courses, basic math courses, and information technology courses to secondary school graduates in preparation for their undergraduate degree programs. Students must successfully complete the GFP program to progress to their respective fields of study.

The GFP at Oman College of Health Sciences (OCHS) is a three-semester program consisting of three levels of English: Level-1, Level-2, and Level-3 (See Table 0.1 for details). The students admitted to the OCHS sit for an English entry exam. Students are then enrolled into an English class according to their exam performance. Students must pass all of the required levels to be awarded a certificate of completion. A student is allowed to repeat each level just once. Students who fail twice are dismissed from the program and thereafter lose their admission to the OCHS.

**Table 0.1** *Levels of English Offered at the GFP With the Corresponding Test Scores on the Placement Test*

English level	Student score on placement exam
Level-1	0–65%
Level-2	65%–85%
Level-3	85% and above

### **Nursing Workforce in Oman: Challenges and Aspirations**

This section presents contextual background about healthcare’s development in Oman and the journey through nursing education in Oman, and it describes factors and challenges associated with nursing education and the nursing profession in Oman. Like other countries of the GCC, Oman had relied for many years on recruiting a foreign workforce in various health

care specialties, including nursing, medicine, and other allied health professions. The high dependency on imported foreign expertise was mainly related to the lack of qualified, local Omani health care professionals and the rapid expansion of health care services that outpaced the human resource development. It became clear to policymakers that although hiring foreign health care professionals helped to meet the required demand, it was only a temporary solution with no potential for sustainability (Al-Mamari, 2012). Such challenges created urgency for self-reliance initiatives. In the 1990s, the national policy of Omanization was instituted to optimize the national capacity and expand employment opportunities for Omani citizens. Under this policy, intensive human resources and financial investments were channeled to prepare the required cadre of locals to gradually fill jobs currently occupied by foreigners (Lakhtakia, 2012).

In response to the self-reliance policy, the Omani Ministry of Health's strategic agenda included expanding the nursing education system. Historically, the Nursing Institute in the capital, Muscat, has been the primary source of Omani nurses since the 1970s (Al-Riyami et al., 2015). More nursing institutes were established across the country, in an attempt to motivate student enrollment by increasing accessibility through providing institutes closer to students' residences, especially for students who lived outside Muscat (White, 2012). To date, seven nursing institutes are now distributed in different regions of the country. These institutes offer a 3-year degree with guaranteed employment upon graduation. Moreover, the institutes provide a tuition-free education to their applicants and support them financially with monthly allowances for accommodations (White, 2012). Students are also provided with transportation to and from the educational institution and their assigned clinical placements.

With all of the strategies employed to attract applicants and increase enrollment, success was evidenced by the growth in the number of Omani nurses, from just five trainees in 1970 to



8,500 nurses in 2011 (Al-Riyami, 2017). According to the Vision 2050 report, Omani nurses' presence in health care settings (government and private health-care facilities) reached 54% in 2012 (Ministry of Health, 2014). Notably, this growth is continuing to progress at a slow pace (Al-Riyami et al., 2015). Studies have attributed this slow progress to the social, religious, and cultural norms in Oman and the surrounding regions, which do not view nursing as a reputable job, particularly for women. It is perceived as a physically draining job with unacceptable working hours (both long working hours and long shifts). In addition, the work environment is one in which women work alongside men, which challenges the conservative social and cultural norms. That said, high school students, both male and female, do not perceive nursing as an appealing profession. In fact, most of the nursing students in the aforementioned institutes indicated that they listed nursing as their last option in their applications for admission to higher education (Al-Riyami, 2015).

Various strategies have been put in place, supported by intensive financial and human resources investments, to enhance the recruitment of Omani locals for the nursing institutes and have ultimately contributed to the nursing workforce in Oman. However, alongside the drive to increase the number of Omani nurses, emerging concerns have arisen with the entry of Omani nurses into health care facilities. The initial concerns were related to the adequacy of the nursing graduates' educational preparedness (Al-Riyami et al., 2015) and the high turnover rates for Omani nurses. Various stakeholders echoed concerns about the quality of the graduates and their preparedness for practice during the first program audit in 2013 (Oman Academic Accreditation Authority, 2013).

### **Program Evaluation in Nursing Education**

Program evaluation can be defined as the systematic process of collecting data to capture a program's context, characteristics, and processes in order to identify areas for potential improvement, develop an understanding of the program's processes, or inform future program decisions (Trevisan & Walser, 2015). Nursing education programs must carry out ongoing program evaluation to assess their effectiveness and promote data-driven decision making with regard to program improvement. However, while the current, most popular practice of educational evaluation is centered on accreditation, Pross (2010) called for nursing programs to strive to promote quality and excellence beyond the accreditation standards.

The demand for effectiveness in nursing education programs is intensified by the need to produce a qualified nursing workforce in order to meet growing, complex health needs. Overall, the advantages of enhancing nursing program outcomes, particularly regarding student success, extend beyond the nursing schools and the students to health-care settings and, ultimately, the community served by nursing graduates. The attention paid to student success varies from examining students' persistence to focusing on the pass rates on the nursing licensing exam. Nonetheless, despite student success being a long-standing area of study, it remains a challenging area for many nursing programs. Hence, it is imperative to understand how program inputs (students' characteristics), dynamics, and environments interact with one another to influence student success (Jeffreys, 2015).

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## **Chapter 2**

### **Literature Review**

This Chapter comprised of two published systematic literature reviews. The first literature review focused on the current practice of program evaluation in a baccalaureate nursing program and the second one focused on predictors of student success. The chapter also includes literature review on the quality of the educational environment, and its influence on student success.

## Systematic Review of Program Evaluation in Baccalaureate Nursing Programs

Al-Alawi, R., & Alexander, G. L. (2019). Systematic review of program evaluation in baccalaureate nursing programs. *Journal of Professional Nursing, 36(4)*, 236–244.  
<https://doi.org/10.1016/j.profnurs.2019.12.003>

### Abstract

Program evaluation is a common practice in nursing education programs; however, evidence indicates that many schools only focus on program evaluation around the scheduled accreditation period, thus reducing the potential value of the evaluation. This systematic review explores the current program evaluation practices of prelicensure baccalaureate nursing programs. ERIC, CINAHL, and Scopus databases were searched to locate original research articles published in English. Twenty articles met the inclusion criteria. The purposes of the evaluated studies varied from needing to meet external accountability requirements to proposing conceptual frameworks and evaluation tools. However, most studies focused on summative evaluation assessing program products and on providing evidence of program evaluation based on descriptive data. Notably, few studies employed a rigorous method to evaluate and interpret program evaluation findings. Most studies solicited information from multiple stakeholder groups, with students being the most represented. Despite the wide range of data collection tools used in the reviewed studies, reporting of validity and reliability was limited. Student grade point average, graduation rate, NCLEX passing rate, and satisfaction with the learning experience were the most common variables. Further studies are needed to assess the effectiveness of current educational program evaluation practices in nursing education.

*Keywords: educational program evaluation, baccalaureate nursing programs, nursing program outcome, summative evaluation, program evaluation*

# **Systematic Review of Program Evaluation in Baccalaureate Nursing Programs**

## **Introduction**

In an era of increased accountability pressure on higher education institutions, educational program evaluation in higher education has become a top priority. Throughout the literature, educational program evaluation in higher education has been linked to evaluation for accountability. This trend is also seen in nursing education, where program evaluation is tied to a systematic program process evaluation prescribed by accreditation bodies. Regardless of the forces that drive educational program evaluation, the consensus is that program evaluation is a necessary process for the establishment and maintenance of high-quality education (Stavropoulou & Stroubouki, 2014b).

Researchers have defined program evaluation as “an ongoing planned intervention that seeks to achieve a particular outcome(s), in response to some perceived educational, social, or commercial problems” (Horne & Sandmann, 2012, p. 571). Program evaluation can also be defined as a systematic process of collecting data to capture a program’s context, characteristics, and processes to identify areas of potential improvement, to develop an understanding of the program’s processes, or to inform future program decisions (Trevisan & Walser, 2015).

Overall, program evaluations may be classified into two types: formative evaluations and summative evaluations. A formative evaluation is intended to improve the program’s process and services by identifying areas for improvement while commending activities shown to be effective. In contrast, summative evaluation is intended to assess the overall merit of the program and is conducted upon program completion (Trevisan & Walser, 2015), and it often includes (a) students’ perceptions of their learning experiences, (b) students’ academic achievement and knowledge acquisition, and (c) the cost-effectiveness of the program (Hartley, 1995).

## **Educational Program Evaluation in Nursing**

The process of educational program evaluation within nursing education has undergone a number of shifts, from evaluations to identify the weaknesses and strengths of educational programs in the 1950s to summative evaluations in the 1960s, and finally to the integration of systematic and continuous quality improvement in the present day (Matthiesen & Wilhelm, 2006). Nonetheless, educational program evaluation remains an outcome-driven assessment conducted at the end of a program to judge its merit (Durdella, 2010). Today, many accreditation bodies pay explicit attention to program outcome assessment as an integral requirement for accreditation (Beasley, Farmer, Ard, & Nunn-Ellison, 2018; Pross, 2010). As a result, pressure has intensified for nursing schools to utilize systematic approaches that provide evidence of their performance. Therefore, program evaluation is now a common practice within nursing schools to ensure compliance with the requirements of accrediting bodies and state boards of nursing (Escallier & Fullerton, 2012; Pross, 2010).

Because of the demand for accountability, the majority of schools today use various surveys or standardized exams and interviews with stakeholders (e.g., faculty, students, and staff) to collect data for program evaluations (Durdella, 2010). It has also been observed that many schools focus on program evaluation only around the scheduled period for accreditation, thus reducing the substantial value that program evaluation might have in ensuring continuous program improvement (Pross, 2010). Additionally, evidence is lacking on the effectiveness of current practices of program evaluation in nursing education (Ardisson, Smallheer, Moore, & Christenbery, 2015). O'Lynn (2017) and Alexander (2019) suggested that nursing programs need to revisit the indicators used to evaluate quality and outcomes. O'Lynn further stated that relying



merely on the accreditor's criteria for program evaluation does not necessarily ensure program quality.

Given the importance and widespread nature of program evaluation, this paper aims to present a systematic review that explores current practices in program evaluation for pre-licensure bachelor's degree nursing programs, which includes identifying the indicators used to assess a program's quality and evaluating its effectiveness. The paper will also discuss findings from available research papers on educational program evaluation, including the research methods employed, program evaluation types, key stakeholders addressed, and variables investigated. Analysis and discussion of the findings, in addition to implications for future studies, will also be presented.

## **Methods**

### **Search Strategy**

The ERIC, CINAHL, and Scopus databases were utilized to locate relevant articles for the current review. A professional health services librarian was consulted regarding which databases and search strategy to use. A systematic search was conducted using the following primary key terms: "baccalaureate nursing education OR undergraduate nursing education AND (program evaluation or program assessment) AND comprehensive program evaluation AND baccalaureate nursing education." Additional terms such as "(evaluation model\*) AND (quality framework\*)" were included to capture evaluation studies focused on the application of an evaluation model. The inclusion criteria were limited to original research articles on program evaluation published in English. Hence, articles focused on the evaluation of master's and doctoral programs were excluded. Furthermore, dissertations, conference proceedings, anecdotal articles on the evaluation process, descriptive articles, and opinion articles were excluded from the search. The authors also decided to exclude studies on the evaluation of online programs

because although the essence of evaluation remains the same regardless of whether the program is traditional or online (Horne & Snadmann, 2012; Russel, 2015), the rapid spread of distance education has resulted in the emergence of new issues and challenges unique to online education and distinct from those of traditional education (Horne & Snadmann, 2012). Thus, the approaches and methods to evaluate online education should be relevant to that unique context.

The search yielded 2,425 articles, which were screened in three phases—title, title and abstract, and content—with the initial aim of removing duplicate articles. After the title review, all duplicate and irrelevant articles were removed. The authors then screened the remaining articles by abstract. Articles on graduate programs, interprofessional program evaluations, literature reviews, and articles limited to a specific curriculum aspect or competency were eliminated. Additional scrutiny was performed as the authors reviewed the articles' content. Articles lacking systematic or empirical research approaches (e.g., having an unclear research method or target population) were excluded with the agreement of both authors. Following this procedure, the authors were left with a total of 20 articles, as illustrated by the Preferred Reporting Items for Systematic Reviews and Meta-Analysis diagram (see *Figure 2.1*). A review matrix was created to facilitate the process of data extraction, analysis, and comparison of the final articles that met the inclusion criteria. Data extracted for analysis included the purpose of the study, research design, study sample, data collection tools used, key findings, and scope of evaluation.

## **Results**

A rich body of literature has offered examinations of program evaluation implementation as well as targeted evaluations of a particular outcome, such as the NCLEX passing rate or clinical placement. The literature also outlined a number of models for program evaluation

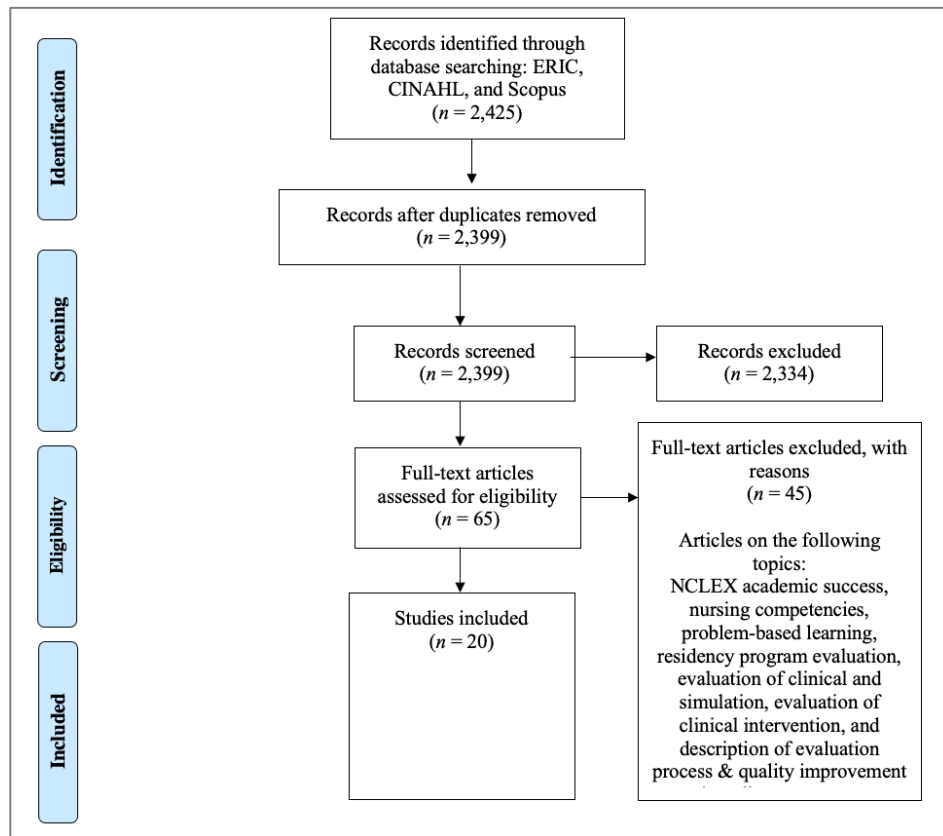
(Pross, 2010). However, research articles on holistic and systematic program evaluations remain limited. The search results for the present review yielded only 20 articles (see *Figure 2.1*). Of these studies, 18 were conducted in the nursing discipline, whereas two were conducted within two or more disciplines: Al Kuwaiti and Subbarayalu (2015) sampled participants from a nursing school and a medical school, whereas Duque and Weeks (2010) included cohorts from business, nursing, and geography programs. The reviewed articles were published between 1985 (Knowles et al., 1985) and 2017 (Murphy, MacKenzie, Alder, & Budz, 2017). The majority of included studies were conducted in the United States ( $n = 7$ ), whereas the others were from Canada ( $n = 3$ ), Thailand ( $n = 2$ ), Pakistan ( $n = 1$ ), Italy ( $n = 1$ ), Greece ( $n = 1$ ), the United Kingdom ( $n = 1$ ), Saudi Arabia ( $n = 1$ ), the Netherlands ( $n = 1$ ), Spain ( $n = 1$ ), and Australia ( $n = 1$ ).

Because common evidence appraisal tools are best suited for evaluating the hierarchy of evidence in intervention studies, no evidence appraisal tool was used in the present review. Instead, the selected articles were evaluated using a checklist adapted from the standard quality-assessment criteria for evaluating primary research papers from a variety of fields by Kmet, Lee, and Cook (2004) and Kraft, Kastel, Eriksson, and Hedman (2016). The evaluation criteria in the checklist were modified to suit the available literature (see *Table 2.1*). The articles were evaluated against 10 criteria and scored based on the extent to which the criteria were fulfilled (i.e., yes = 1, no = 0). Inapplicable criteria were marked as “NA” and excluded from the summary score. The score allotted to each publication was calculated by summing the total obtained score and the number of inapplicable criteria and then dividing the resulting score by the maximum possible score (i.e.,  $X + \text{number of N/A}/10$ ). Articles that met all 10 quality-assessment criteria accumulated a score of 1, and 0.1 was deducted for each missing criterion. Overall, the scores of the retained articles in this review ranged between 0.8 and 1 on the criteria

of evaluation. Further descriptions of the reviewed articles and results were organized around six themes: (a) the study purpose, (b) the type of evaluation, (c) variables addressed and evaluated in the articles, (d) key stakeholders involved, (e) the research design and data collection method, and (f) the theoretical basis that guided the evaluation study.

**Figure 2.1**

*PRISMA Diagram*



**Table 2.1**

*Quality Assessment Criteria for Evaluating Primary Research Papers*

Criteria of Evaluation	Yes = 1	No = 0	N/A	Total
1. Research question/objective is clearly described and relevant to educational program evaluation in nursing.				
2. The type of approach is empirical.				

3. The context/country of the study is described.
4. The theoretical framework is stated.
5. Variables/domains are evaluated/outlined.
6. Data collection method is described.
7. Reliability and validity of data collection tools are reported.
8. Study sample is defined.
9. Data analysis is clearly described.
10. Results and conclusion are reported in sufficient detail.

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Note: Adapted from Kmet, L. M., Lee, R. C., & Cook, L. S. (2004). *Standard quality assessment criteria for evaluating primary research papers from a variety of fields* (copyright 2004 by the Alberta Heritage Foundation for Medical Research), pp. 4 & 5; and from Kraft, M., Kastel, A., Eriksson, H., & Hedman, A. R. (2016). "Global nursing—A literature review in the field of education and practice." *Nursing Open*, 4, 125.

### **Purpose of the Article**

A certain pattern was noted with regard to the purpose of each reviewed article. Accordingly, the articles were categorized into four types based on their purpose: (a) those that presented an evaluation in preparation for or to fulfill accountability requirements, (b) those that introduced an evaluation model or evaluation tool, (c) those that assessed end-of-program outcomes and stakeholders' perceptions of program quality, and (d) those that evaluated both program implementation and outcomes for improvement purposes.

A total of three studies focused on program evaluation as a part of the process for fulfilling the requirements of accreditation bodies. For example, Ryan and Hodson (1992) evaluated nursing program outcomes by collecting data from graduates and employers to establish a comprehensive longitudinal database of feedback from both employers and graduates. This database was intended to be used to demonstrate evidence of program quality for accreditation revision. Knowles et al. (1985) also surveyed nursing graduates and their clinical supervision in an attempt to interpret their perceptions of program quality. The researchers

reported that the findings would be used to demonstrate compliance with accreditation standards. Similarly, Rexwinkel, Haenen, and Pilot (2013) designed an evaluation instrument to evaluate the performance of nursing degree programs. The researchers concluded that the instrument could assist nursing schools in demonstrating compliance with accreditation by providing reliable and valid evidence of program outcomes.

Four studies aimed to introduce or draw upon a specific evaluation theory or conceptual model to provide evidence regarding the benefits of a theoretical basis in guiding program evaluations in nursing education. Stavropoulou and Stroubouki (2014b) highlighted the potential for realistic evaluation theory in capturing the relationship between the program implementation process and end-of-program outcomes. The researchers emphasized that a theory relying on multiple sources of data, such as field observations, interviews, document analyses, and stakeholder surveys, could produce sound data to support program reform and accountability. Likewise, other researchers introduced various models in their evaluation studies. For example, Al Kuwaiti and Subbarayalu (2015) proposed the use of the Six Sigma model to guide the development of a quality rating scale. Additionally, Duque and Weeks (2010) proposed an evaluation model borrowing concepts from the service marketing and assessment literature. Ajpru, Pasiphol, and Wongwanich (2011) developed a model to assess the quality of instruction in a nursing program. Notably, the researchers ensured that the elements of the instructional quality-assurance model were developed in accordance with respected accreditation bodies in Thailand. Furthermore, the three latter studies identified the need for further research to validate these models and their applicability across nursing programs.

In line with the introduction of a model or evaluation tool, two studies in this review introduced measurement tools for conducting program evaluations. Macale et al. (2014) tested a

psychometric tool known as the Quality Evaluation of Bachelor Degree in Nursing, Version 2 (QBN2), which aimed to explore students' perspectives regarding the quality of programs. The QBN2 instrument focused on seven variables: a) quality of teachers, b) quality of services and organization support, c) quality of clinical experience, d) quality of administrative services, e) didactic organization and quality of student evaluations, f) objective relevance to the discipline, and g) professional identity of students. The other study to propose an evaluation tool was that of Al Kuwaiti and Subbarayalu (2015). The researchers in this study introduced a quality rating scale based on the Six Sigma analytical tool, which was used to elicit student perceptions and satisfaction regarding educational program quality. Therefore, this article could also fit into the category of articles focused on evaluating end-of-program outcomes and exploring stakeholder satisfaction regarding educational output.

Regarding assessment of program quality from stakeholders' perspectives, nine studies were conducted using a stakeholder-focused approach with the purpose of gaining insight into the program quality from multiple stakeholder groups' viewpoints (e.g., students, alumni, faculty, employers, and clinical mentors): Al Kuwaiti and Subbarayalu (2015); Barrett and Arklie (1996); Gul, Paul, and Olson (2009); Murphy et al. (2017); Nugent and LaRocco (2014); Ouellet, MacIntosh, Gibson, and Jefferson (2008); Raines (2007); Saksomboon, McMillan, and Cholowsk (2002); and Stuenkel, Nelson, Malloy, and Cohen (2011). Broadly, students expressed overall satisfaction with their learning experiences, curriculum delivery, and readiness for practice (Barrett & Arklie, 1996; Nugent & LaRocco, 2014). However, common recommendations from both students and employers concerned increasing clinical practical time (Barrett & Arklie, 1996; Nugent & LaRocco, 2014; Ryan & Hodson, 1992). Similar results were presented by Al Kuwaiti and Subbarayalu (2015), in whose study students expressed a need to

enhance their learning experiences and to improve key support resources, such as library services.

Finally, with regard to assessing program implementation processes and outputs, only one study was conducted with the purpose of evaluating program outcomes as well as program implementation. In this study, Saksomboon, McMillan, and Cholowsk (2002) conducted a comprehensive evaluation to determine the quality of a program curriculum, its objectives, and its relevance to the healthcare context, thereby identifying areas for improvement. Saksomboon et al. determined that the nursing program lacked an adequate number of instructors to effectively conduct the program. Moreover, the faculty mentioned a lack of learning materials as well as resource constraints for program implementation. Therefore, the researchers recommended improving the school's learning and financial resources, teaching methods, and organizational support for faculty.

### **Type of Evaluation**

Inspection of the reviewed articles, based on the type of evaluation utilized, indicated that the articles could be classified into summative evaluation studies or formative evaluation studies according to the definitions presented earlier in the paper. Summative evaluation is concerned with judging the quality and effectiveness of a program by focusing on evaluating end-of-program outcomes, whereas formative evaluation is conducted early on or during a program with a focus on program delivery activities and the process of identifying deficiencies and plans for improvement (Trevisan & Walser, 2015). Articles that integrated both forms of evaluation were categorized as comprehensive evaluation studies.

Table 1 shows that 18 studies employed summative evaluation to capture the end product of the educational program (e.g., Barrett & Arklie, 1996; Duque & Weeks, 2010; Hartley, 1995;



Marquis & Worth, 1992; Murphy et al., 2017; Ouellet et al., 2008; Raines, 2007; Ryan & Hodson, 1992; Stockhausen & Kawashima, 2003; Stuenkel et al., 2011). As previously mentioned, most articles focused on end-of-program outcomes, using various methods to obtain insights regarding students' learning experiences, alumni satisfaction, graduates' level of preparedness for practice, and employers' perspectives regarding program outputs.

Two articles used a comprehensive program evaluation that included both formative and summative evaluation to assess the implementation of nursing programs in addition to the program outcomes (e.g., Saksomboon et al., 2002; Stavropoulou & Stroubouki, 2014b). Saksomboon et al. (2002) conducted a mixed-methods evaluation study on a baccalaureate nursing program in Thailand. The evaluation included examination of the alignment between the program objectives and the processes designed to carry out the program as well as the relevance of the program objectives and competencies to the healthcare setting. Various stakeholders identified multiple areas for improvement; for example, employers reported the necessity of bridging the theory–practice gap among nursing graduates. Faculty, students, and some clinicians voiced concern that the lack of financial and human resources—in addition to insufficient learning materials—acts as a barrier to successful program implementation. Though the primary aim of the evaluation study conducted by Stavropoulou and Stroubouki (2014b) was to demonstrate the advantage of realistic evaluation theory in guiding comprehensive evaluation, the results uncovered some program areas that are usually neglected in evaluations. For example, realistic evaluation theory places emphasis on the program context, group dynamics, students' backgrounds, and culture. As a result, the researchers reported that the use of self-reported structured questionnaires did not provide adequate information regarding the contextual factors influencing program implementation. However, the incorporation of observations, reflections,

and interviews revealed that students living in rural areas encountered challenges in accessing the program. Overall, almost all the included studies focused on a set of end-of-program outcomes in addition to graduate and employer satisfaction.

### **Variables Evaluated**

The variables and program domains investigated in each article were determined by the type and purpose of the evaluation study. For instance, summative evaluations examined end-of-program variables, whereas comprehensive evaluations focused on end-of-program outcomes and used qualitative methods to gain deeper insights regarding program resources, support services, and implementation challenges. The present review included a variety of nursing programs from diverse countries; nonetheless, consensus exists on what seems to define essential end-of-program outcomes for judging overall program quality. Some of the common end-of-program outcomes addressed in summative evaluations included student grade point average, graduation rates, passing rates for an exit or licensure exam, program attrition rate, and employment rate. Data on all these variables were accessible through school documents. Additional variables such as students' competency levels, alumni performance in clinical settings, stakeholders' perceptions of program quality, student satisfaction (Barrett & Arklie, 1996; Duque & Weeks, 2010; Knowles et al., 1985; Macale et al., 2014; Murphy et al., 2017; Ouellet et al., 2008; Ryan & Hodson, 1992; Raines, 2007; Saksomboon et al., 2002), and preparedness for practice were collected using end-of-program surveys (Nugent & LaRocco, 2014; Ouellet et al., 2008; Raines, 2007). *Table 2.2* shows the common variables assessed in the reviewed articles

**Table 2.2** *Common Indicators Examined in the Literature Review*

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Common End of Program Outcomes
<ul style="list-style-type: none"><li>• Student GPA</li><li>• Student performance on standardized exams</li><li>• Student retention, attrition, &amp; graduation rates</li><li>• Passing rate of licensure exam</li><li>• Employment rate</li><li>• Graduate perceptions of learning experience &amp; readiness for practice</li><li>• Student satisfaction with program quality</li><li>• Graduates' self-reported competency</li><li>• Employer evaluation of graduates</li></ul>

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### **Key Stakeholders**

The evaluation in nearly all the reviewed studies followed a stakeholder-focused approach in which stakeholders were asked to provide their input regarding program effectiveness. Various stakeholder groups in higher education contribute to or benefit from the provision of education. As a result, stakeholders are categorized into internal stakeholders (who play an important role in supporting the development of universities) and external stakeholders (who are either the beneficiaries of educational products or forces that shape policies governing education). Internal stakeholders include deans, faculty, administrators, program coordinators, student cohorts, and alumni, while employers, clinical supervisors, and accrediting bodies represent external stakeholders (Moraru, 2012). Most of the reviewed studies were conducted within school programs and were thus focused on student cohorts, alumni, faculty, and, sometimes, employers. However, this review revealed that students and alumni were recognized as the primary stakeholders in most studies. Thirteen of the studies collected data from multiple stakeholder groups (e.g., Ajpru et al., 2011; Barrett & Arklie, 1996; Duque & Weeks, 2010; Gul et al., 2009; Murphy et al., 2017; Ouellet et al., 2008; Rexwinkel et al., 2013; Stuenkel et al., 2011). In many studies, students reported overall satisfaction with the program and with their level of preparedness for practice upon program completion (Ouellet et al., 2008; Raines, 2007;

Stuenkel et al., 2011). However, Al Kuwaiti and Subbarayalu (2015), who investigated the perceived learning experience of Saudi nursing and medical students, reported students' dissatisfaction with many aspects of their learning experiences. For example, students reported a lack of satisfaction in relation to the effectiveness of teaching and learning facilities, ineffective teaching faculty, and poor library resources.

Similarly, studies that obtained faculty and employer opinions revealed stakeholders' satisfaction with graduates' level of preparedness for practice and high levels of satisfaction in general (Gul et al., 2009; Ouellet et al., 2008). However, there were some exceptions. Skamboon (2002) determined that clinical nurses had concerns that students lacked the ability to transfer knowledge to practice and required more skills-based practice. Similar comments were reported by Stuenkel et al. (2011), who stated that graduates lacked key skills to perform nursing care. Communication and critical-thinking skills were also identified as areas for improvement. Other concerns raised by employers were related to clinical placement planning. For example, some employers reported a lack of communication regarding clinical schedules and student placements. Other stakeholders emphasized the need to ensure the congruency of the curriculum with the needs of the healthcare system and the broader community (Murphy et al., 2017; Saksomboon et al., 2002).

### **Research Approach and Data Collection Methods**

The studies in this literature review featured use of various research approaches. Nine of the studies utilized a mixed-methods approach to guide the evaluation study, nine relied solely on a quantitative approach (see Table 1), and the remaining two studies used a qualitative approach (e.g., Gul et al., 2009; Stockhausen & Kawashima, 2003). Over half of the quantitative studies were descriptive in nature. Two studies were a correlational design (e.g., Knowles et al.,

1985; Marquis & Worth, 1992), one was a comparative study (Ouellet et al., 2008), and one was a multimethod study (Duque & Weeks, 2010). Knowles et al. (1985) sampled two student cohorts to explore the relationship between students' perceptions of their learning experience and clinical supervisors' evaluations of student performance. The researchers reported no association between student ratings of their learning experience and supervisors' ratings of graduate clinical performance. Another correlational study by Marquis and Worth (1992) evaluated the relationship between internal school measures (e.g., students' nursing GPA and faculty clinical evaluations) and external outcomes (e.g., students' NCLEX scores and student competency levels) and ratings by clinical supervisors. The findings indicated that internal school outcomes were significantly correlated with student NCLEX scores; nonetheless, none of the internal measures were correlated with the supervisor ratings of student competency. Furthermore, Ouellet et al. (2008) compared two cohorts based on graduates' perceptions of their level of preparedness for practice upon graduation and eight months postgraduation. The results showed no difference between the students' self-rating of their preparedness level for clinical practice at graduation and eight months after employment. Finally, Duque and Weeks (2010) introduced a model to assess student satisfaction regarding program quality. The researchers also examined the relationship between student perceptions of education and resource quality and student satisfaction. The study reported that nursing student satisfaction was significantly correlated with educational quality, but it was not correlated with the quality of program resources.

All mixed-method studies relied primarily on questionnaires that were analyzed descriptively and complemented by using qualitative data, including focus group interviews for data collection. Both quantitative and qualitative studies utilized an array of surveys to collect data from various stakeholder groups, including students, faculty, nurse preceptors, and

employers. Some of the most common tools used were alumni surveys, student experience surveys, competency rating scales, clinical evaluation surveys, employer surveys, and the Scale for Quality Evaluation of the Bachelor Degree in Nursing. Most of the instruments were self-report tools administered to student alumni, faculty nurse preceptors, and employers to collect a range of data, such as (a) student and alumni satisfaction regarding their learning experience, (b) the quality of the program, (c) the level of graduate preparedness for practice, and (d) the level of graduate performance in clinical settings. Notably, most of the quantitative research represented descriptive studies. Moreover, relatively few papers reported the reliability and validity of the selected instrument within the sampled population (e.g., Barrett & Arklie, 1996; Ouellet et al., 2008; Raines, 2007; Ryan & Hodson, 1992; Saksomboon et al., 2002).

As for the qualitative studies, two of them aimed to capture student learning experiences and perceptions regarding their learning experience in a unique context. For example, Stockhausen and Kawashima (2003) studied Japanese student nurses' international learning experiences, whereas Gul et al. (2009) investigated the perspective of Pakistani nursing baccalaureate graduates and nursing supervisors on their practice preparedness upon completing the baccalaureate program (transitioning from students to professional nurses). Both studies reflected on the uniqueness of their assessed programs' respective contextual factors. Whereas Japanese nurses and Pakistani graduates voiced satisfaction with their learning experiences (Gul et al., 2009; Stockhausen and Kawashima, 2003), Pakistani graduates expressed dissatisfaction with their working environment as nurses. The graduates further explained that the work environment matched their expectations. Hence, challenges such as lack of nurse autonomy, high workload, and negative nurse-physician relationships were perceived as primary obstacles to retaining graduates in clinical settings (Gul et al., 2009).

## **Theoretical Basis of the Evaluation**

Though the methodological research design and type of evaluation were important to addressing program variables, the theoretical underpinnings of evaluations were equally important. Only half of the studies in this review reported on the conceptual model or theory that informed their evaluation (e.g., Al Kuwaiti & Subbarayalu, 2015; Barrett et al., 1996; Nugent & LaRocco, 2014; Saksomboon et al., 2002; Stockhausen & Kawashima, 2003). Some of the models utilized in the reviewed studies were the Six Sigma model (Al Kuwaiti & Subbarayalu, 2015), the Context, Input, Process, and Product (CIPP) evaluation model (Barrett et al., 1996; Saksomboon et al., 2002), and the realistic evaluation theory (Stavropoulou & Stroubouki, 2014b). Nugent and LaRocco (2014) used the essentials of baccalaureate nursing education developed by the American Association of Colleges of Nursing as a model for the program evaluation.

## **Discussion**

In the quest to promote excellence in nursing, the National League for Nursing attested that it was not acceptable for nursing schools to settle for satisfying the minimum requirements of accreditation; rather, they should strive to exceed the regulatory requirements (Pross, 2010). Hence, accrediting bodies emphasize the necessity for comprehensive educational program evaluations. Four key accreditation standards were identified by the Commission of Collegiate Nursing Education (CCNE) to assess the programs through in-depth program evaluation and reflection and to determine whether they complied with quality standards. These standards include program quality and program effectiveness. Program quality encompasses four standards: (a) program mission and goals, (b) quality of curriculum and teaching and learning practices, (c) institutional commitment, and (d) resources. Program effectiveness includes the

evaluation of program outcomes (American Association of Colleges of Nursing, 2013). The Academic Quality Improvement Program (AQIP), which is a part of the higher learning commission, has also delineated a focus similar to that of the CCNE. Hence, the focus of AQIP accreditation includes students' learning, the needs of students and stakeholders, leadership, communication, and quality improvement plans (Dulski, Kelly, & Carroll, 2006). The reviewed studies showed that the standards and focus domains of accrediting bodies were well recognized by nursing schools. Some studies were conducted for the purpose of preparing for accreditation (Knowles et al., 1985; Rexwinkel et al., 2013; Ryan & Hodson, 1992), whereas others proposed innovative models and tools to measure program quality. Furthermore, many attempted to address the needs of stakeholders and assess their satisfaction. Nonetheless, obvious emphasis was put on program effectiveness, as evidenced by the dominant use of program summative evaluation to evaluate program outcomes (see Table 1).

Moreover, it was clear that all variables evaluated in the reviewed literature reflected the accreditation requirements in one way or another. Thus, although the variables addressed in this literature review varied across studies, a pattern of common variables existed among schools, including program outputs, methods of obtaining data for evaluation, targeting of stakeholders, time of feedback collection, and data presentation. The most common variables evaluated were student satisfaction (Duque & Weeks, 2010), students' perceptions of their learning experience (Raines, 2007; Stockhausen & Kawashima, 2003), and stakeholders' (e.g., alumni, employers, and faculty) perceptions of program quality and graduate competency (Barrett & Arklie, 1996; Duque & Weeks, 2010; Knowles et al., 1985; Macale et al., 2014; Murphy et al., 2017; Ouellet et al., 2008; Raines, 2007; Ryan & Hodson, 1992; Saksomboon et al., 2002). Most of these data were collected at the end of the program or after program completion using surveys and were



complemented by focus group interviews in some cases (e.g., Barrett & Arklie, 1996; Diefenbeck et al., 2015; Hartley, 1995; Nugent & LaRocco, 2014; Saksomboon et al., 2002; Stuenkel et al., 2011). Other assessed variables included end-of-program outcomes such as the licensure exam passing rate (Marquis & Worth, 1992; Nugent & LaRocco, 2014; Ouellet et al., 2008; Stuenkel et al., 2011), graduation rate, employment rate (Murphy et al., 2017; Nugent & LaRocco, 2014), and student grade point average (Marquis & Worth, 1992; Stuenkel et al., 2011). The use of variables such as licensure passage rate, graduation rate, and employment rate within nursing schools' evaluations has been subject to criticism. Nursing schools already have highly selective admissions criteria and punitive progression policies in place to increase the likelihood of student success (O'Lynn, 2017; Spector, Hooper, Silvestre, & Qian, 2018). As a result, it is unclear whether the licensure passage rate and graduation rate are affected by nursing school admission and progression policies, program quality, or some combination of the two factors. The employment rate as a program quality indicator has been recognized as the least reliable. Employment rates are affected by the changing job market and the accuracy of data collected by schools regarding the employment status of its graduates. Therefore, these variables are not necessarily indicative of nursing program quality (Spector et al., 2018).

The trend of focusing on end-of-program outcomes using summative evaluation is interesting in the context of a growing body of literature suggesting the importance of formative evaluation in generating continuous improvement in program implementation and ensuring efficiency in channeling budgets, human resources, and time in a productive manner (Fitzpatrick, Sanders, & Worthen, 2004). Moreover, Roxburgh et al. (2008) argued that examining program inputs, processes, and activities throughout program delivery is just as important as examining program outcomes. In studies in the quality field, higher education institutions are viewed as

providers of a service that is produced, delivered, and consumed simultaneously. Hence, collecting feedback on this service at the time of its delivery—rather than solely retrospectively at the end of a program—can ensure the reliability of the measures and the meaningfulness of the collected data (Al Kuwaiti & Subbarayalu, 2015). In part, the rationale behind the popularity of summative evaluation can be explained by the fact that most evaluation studies are initiated to meet the requirements of accrediting bodies, which focus on program effectiveness (Lannan, 2017). Billings and Halstead (2016) also reported that the prevailing practice regarding program evaluation in nursing schools is a periodic evaluation process conducted only during program accreditation.

In the same vein, summative program evaluation focuses on consumers (Fitzpatrick et al., 2004), and the studies in this review collected feedback from a varied group of consumers and stakeholders, including students, alumni, faculty, clinical supervisors, nurse mentors, and employers. The common aim of including multiple stakeholders was to solicit input on the perceived quality of the program from various perspectives (Macale et al., 2014). However, students appeared to be the most dominant stakeholders addressed in the literature. The importance of students' feedback was highlighted by the measurement of student satisfaction along with program quality, their perception of the learning experience, their preparedness for practice, and their perceptions of competency upon graduation. The value of students as key stakeholders is not surprising because students are the primary consumers of higher education services (Al Kuwaiti & Subbarayalu, 2015). Moreover, student satisfaction has been recognized by the American Society of Quality as one of the essential dimensions of quality in teaching (Brown & Marshall, 2008). Considerable attention has been paid to obtaining employer feedback regarding the performance of nursing graduates. Stuenkel et al. (2011) emphasized the

importance of creating a climate of communication and collaboration among different stakeholders, particularly employers, to enable the school to gain long-term feedback regarding its alumni and ease graduates' transition into practice. Overall, as previously stated, feedback from students and other stakeholders is considered an invaluable component of accreditation (Dulski et al., 2006).

Certainly, this review indicated the value of students' and stakeholders' views regarding educational program quality. However, the data collected must be relevant, reliable, and valid (Dulski et al., 2006). An important note here is that the majority of studies included in the present review relied on self-report data and the perceived experiences of both faculty and students. Ramlo (2015) argued that the perceptions of students and faculty of their respective programs may be controversial because of the high subjectivity. Porter (2011) provided evidence that despite the heavy reliance on self-report student surveys in higher education institutions, students lack accuracy in reporting their learning experience. The authors also urged universities to reexamine the validity of the instruments they use.

In line with the importance of the reliability of tools used to collect data from students, nearly all the studies reviewed used questionnaires or surveys as tools for collecting data from multiple stakeholder groups. Some of the questionnaires were modified versions of existing tools used by school administration to collect feedback, such as alumni surveys, employer surveys, and students' clinical evaluation tools, whereas others were developed solely for the purpose of the study (Al Kuwaiti & Subbarayalu, 2015; Barrett & Arklie, 1996; Macale et al., 2014; Nugent & LaRocco, 2014). Notably, only six studies reported the reliability and validity of the instruments employed for program evaluation (Barrett & Arklie, 1996; Ouellet et al., 2008; Raines, 2007; Rexwinkel et al., 2013; Ryan & Hodson, 1992; Saksomboon et al., 2002).

Apart from the credibility of the employed instruments, nine studies relied solely on quantitative methods; however, such methods have been subject to criticism in program evaluation. Evidence from the literature suggests that traditional methods of evaluation using quantitative methods offer limited insight into programs in which the information provided is insufficient to offer answers to the questions of “what works, for whom, and in what circumstances” (Stavropoulou & Stroubouki, 2014a, p. 201). For example, quantitative research provides statistical data on satisfaction, graduation, attrition, employment, and NCLEX passing rates but cannot offer an explanation for what processes work to achieve success or why particular processes are ineffective. As noted, most of the reviewed studies reported positive end-of-program outcomes and positive satisfaction with program quality. These results, however, did not offer any insights about the strategies or processes that contributed to such successful outcomes. Thus, the sole reliance on quantitative data for program evaluation has been criticized for its inadequacy in addressing important aspects of programs, such as the program context, culture, and participant values. Thus, more qualitative approaches have been introduced in evaluation to fill the identified gaps. Subsequently, mixed-methods evaluation has been highly regarded because of its ability to offer a more holistic approach to evaluation. The advantage of using mixed-methods evaluation to avoid the disadvantages of solely employing quantitative evaluation was highlighted in a study by Nugent and LaRocco (2014). The researchers surveyed 62 graduates to elicit their perceptions of program quality. The quantitative data suggested overall graduate satisfaction with the program and clinical experience. However, the qualitative data revealed some concerns regarding limited simulation exposure as well as the duration of clinical placement. In another study, Stuenkel et al. (2011) conducted a mixed-method evaluation study focused on end-of-program outcomes. The quantitative data revealed that the program was

effective, with a 100% graduation rate, a 99% RN-NCLEX passing rate, and a 97% retention rate. However, the qualitative data indicated graduate dissatisfaction with the workload and some aspects of program planning. Moreover, the faculty expressed concerns regarding the students' communication skills, whereas employers reported graduate weaknesses in critical-thinking skills and professional communication as well as challenges in transitioning to professional roles.

Furthermore, this review revealed that few studies used rigorous methods to analyze and interpret program evaluation findings or to create a connection between various findings; rather, the studies focused on providing evidence of program evaluation based on descriptive data. This finding is in agreement with that of Murphy et al. (2017), who determined that the results of most evaluation studies in nursing are based on descriptive data analysis alone. Notably, only four studies utilized a rigorous research approach: two were correlational studies (Knowles et al., 1985; Marquis & Worth, 1992), one was a comparative study (Duque & Weeks, 2010), and one employed multi-quantitative methods (Ouellet et al., 2008).

Another important finding is that many of the reviewed studies did not report on or mention the theoretical evaluation models or theories used to guide and structure the evaluation process. Suhayda and Miller (2006) noted that, in spite of the growth in educational evaluation models, nursing education rarely applies theoretical models to its evaluation process. The lack of a theoretical basis for guiding the evaluation in most reviewed articles indicates that evaluation remains a task or process for demonstrating compliance with accreditation standards—a task that targets specific criteria and outcomes of evaluation rather than targeting improvement processes in the nursing program (Brady, 1986). Another potential explanation for this finding is that nursing schools align their evaluations with their respective accreditation bodies, thus focusing solely on the relevant criteria for those bodies (Carroll, Thomas, & Dewolff, 2006). However,

the use of evaluation theories and conceptual models to guide educational program evaluations is important to facilitate an organized, comprehensive, and coherent evaluation plan (Suhayda & Miller, 2006).

### **Limitations**

The present review was limited to three databases and used limited keywords; therefore, it is possible that additional articles may be present in other databases, and some may be found by searching the reference lists of the resulting articles. The search excluded non-English articles, which raises the possibility that the excluded studies might have contributed to the review. In spite of these limitations, this literature review offered an exploration of articles from a wide range of publication dates and from diverse disciplines, settings, and countries, providing a rich view of program evaluation from different perspectives.

### **Conclusions**

A comprehensive literature review was conducted by searching three databases using relevant key terms. Ultimately, 20 articles from various countries met the inclusion criteria. The studies varied in purpose, from the need to meet external accountability requirements to proposing the use of a particular conceptual framework to proposing an evaluation tool. Furthermore, most studies reported descriptive findings of program outcomes but lacked rigor in validating these findings by exploring the links between various program outcomes. It was evident that feedback from multiple stakeholder groups was valued. In particular, students' voices were well represented in all evaluations through use of various self-report questionnaires and satisfaction surveys. The review also revealed that the literature lends high value to program evaluation in nursing education, as demonstrated by the variety of articles describing the process of educational program evaluation, focusing on a single domain of the program, and emphasizing

the importance of program quality. Notably, nursing schools placed more emphasis on data gathering and far less emphasis on the process and methods of evaluation. In that respect, there continues to be a lack of comprehensive program evaluation research studies focused on all program components from program inputs, processes, and implementation to outcomes that are supported by rigorous methodologies and reliable data collection tools. Additionally, many nursing schools continue to follow the periodic, traditional means of program evaluation prescribed by accreditation; however, sparse evidence and research exists to inform the public on the effectiveness of this form of evaluation.

### **Implications**

The prevailing nature of educational program evaluation research suggests a crucial future agenda that requires attention. Beyond descriptive research studies, more rigorous designs are needed to determine the relationship between various program outcomes. It is imperative that evaluation studies be theoretically guided to guarantee a systematic approach to evaluation. Additionally, studies scrutinizing the validity and reliability of tools used for data collection are indispensable for determining their ability to convey the program quality. In that respect, these research areas can capture the most reliable and meaningful outcomes that reflect program quality rather than superficially monitoring prescribed outcomes for accountability purposes. Educational program evaluation can be complex and time consuming; therefore, studies assessing the effectiveness of current practices in nursing educational program evaluation are invaluable. Continued research on educational evaluation studies ensures curriculum relevance, the quality of student experience, and the engagement of stakeholders in program improvement. The findings will also be relevant to helping disseminate best practices regarding program quality and stimulate further research.

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# **Systematic Review: Predictors of Students' Success in Baccalaureate Nursing Programs**

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## **Abstract**

Nursing schools strive to select a diverse student population who are likely to succeed by ensuring timely student progression through the program and effective use of educational sources. The purpose of this systematic literature review is to explore the preadmission variables and selection criteria that predict student success in 4-year baccalaureate nursing programs in the U.S. Sixteen articles met the eligibility criteria, and six measures were used to define student success: (a) early academic success, particularly during the first and second year; (b) attrition; (c) timely completion of the program; (d) graduation; (e) performance in nursing courses; and (f) academic performance in other science courses. Typically, the core set of cognitive predictors used in the admission process in nursing schools were pre-nursing GPA, pre-nursing collegiate science GPA, and scores on standardized aptitude exams. This review suggests that it is challenging to isolate one single variable as the best predictor of student success; however, using a combination of variables can offer a reliable prediction method. More researchers should consider using a theoretical basis to guide their inquiry on this topic. Additionally, researchers should examine admission variables that are most relevant across programs.

*Keywords:* admission criteria, predictors of student success, selection criteria, student success, baccalaureate nursing program, nursing education

# **Systematic Review: Predictors of Student Success in Baccalaureate Nursing Programs**

## **Introduction**

As complex healthcare needs continue to rise due to an increasing aging population, the demand for more registered nurses (RNs) is mounting. Meanwhile, the long-standing nursing shortage still exists (American Association of Colleges of Nursing [AACN], 2019; McClelland et al., 1992). In the United States, according to recent reports on RN supply and demand projections, the nursing workforce is expected to grow from 2.9 million in 2016 to 3.4 million nurses in 2026. Despite this growth, the predicted demand is estimated to be 203,700 RNs each year. Meanwhile, healthcare setting is anticipated to lose a significant segment of its nursing workforce—or about one million registered nurses—by 2030 due to retirement (AACN, 2019). In 2010, a landmark report on the future of nursing, issued by the Institute of Medicine and Robert Wood Johnson Foundation, declared the need for an 80% growth in the number of baccalaureate-prepared nurses to respond to complex patient needs (Altman et al., 2016).

Today, 10 years later, this recommended increase has still not been realized. In fact, despite the increase in enrollment in entry-level baccalaureate programs, there are still insufficient numbers to cover the demand (AACN, 2019). Amid these challenges, nursing education is facing a multitude of barriers to meeting the growing need for more RNs. For example, there is a scarcity of educational resources to accommodate the increased enrollment coupled with the unresolved problem of student attrition (Horkey, 2015; Mooring, 2016). In fact, reports from 2018–2019 show that baccalaureate and graduate nursing programs denied admission to 75,000 qualified applicants, primarily due to limited educational resources (AACN, 2019). Additionally, about 50% of nursing students discontinue their nursing academic pursuits



before graduation (Bennett et al., 2016; Mooring, 2016), making the selection of nursing applicants a critical process.

Attrition, in particular, is an alarming issue because students failing or dropping out of a program causes not only a loss of financial and time investment for students but also a burden on the already limited academic resources (Bennett et al., 2016; Pross, 2010; Tartavouille et al., 2018). It further hampers progress toward meeting the need for more RNs (Bennett et al., 2016). Researchers have suggested that high attrition rates among nursing students are attributable to ineffective admission policies that fail to weed out potentially unsuccessful students (Newton & Moore 2009; Newton et al., 2007).

Another challenge for nursing programs is enhancing the diversity of the nursing workforce, a national priority, to ensure that the nursing workforce mirrors the diversity of the populations they serve (Altman et al., 2016; Johnson et al., 2020). According to occupation reports, despite slow growth, racial and ethnic minorities remain underrepresented in the nursing workforce, which is currently dominated by Whites (83%) compared with other ethnic and racial groups (i.e., African Americans, 6%; Hispanic or Latino, 3%; Asians, 6%; and American Indian and Native Hawaiian 2%; National League for Nursing [NLN], 2016). Likewise, males nurses are also underrepresented. The National Council reports indicated that male nurses constituted only 9.1% of the nursing workforce (National Council of State Boards, 2017). In 2011, only 26.8% of the students enrolled in baccalaureate nursing programs were identified as minority students (Phillips & Malone, 2014). Nursing education programs are striving to attain gender, racial, and ethnic diversity in the student population while also gauging the effectiveness of various student recruitment strategies.

Given the current trends in nursing education, the field faces a number of challenges, including increasing the number of nursing graduates, reducing student attrition to meet future projected nursing shortages (Elkins, 2015; Horkey, 2015), increasing diversity among the student population (Strickland & Cheshire, 2017), maintaining quality education to ensure students are safe practitioners (Diaz et al., 2012; Tartavouille et al., 2018), and meeting the standards of external accrediting bodies by providing evidence of first-time NCLEX passing rates (Elkins, 2015). All of these challenges must be met while nursing education also struggle with limited resources (AACN, 2019).

Nursing schools apply rigorous admission criteria to select students. The purpose of this selection process is to (a) ensure selection of academically qualified students who are likely to succeed in the program; (b) recruit diverse student populations; (c) ensure timely progression through the program, which allows the institution to increase its admission capacity; and (d) ensure effective use of the limited educational resources (Pross, 2010; Tartavouille et al., 2018). Newton et al. (2007) argued that effective admission policies promote student success and prevent failure. To achieve this goal, admission policies must have an empirical basis to identify variables that are valid and reliable predictors of student success, along with variables that are early risk indicators (Newton et al., 2007).

To date, despite the extensive research conducted in the area of student selection for nursing programs, identifying the variables associated with future success or finding the right combination of variables to predict student success remains a vital research area. This systematic literature review aims to explore the pre-admission variables and selection criteria that predict student in-program success in 4-year baccalaureate nursing programs in the United States.

## Method

A literature review was conducted using three primary databases: Scopus, CINAHL, and ERIC, using key terms such as “admission criteria AND nursing students’ success,” “school admission AND predictors of success AND baccalaureate nursing students,” “predictors of student success AND baccalaureate nursing program,” “entry criteria AND student success,” and “undergraduate nursing education OR traditional nursing program.”

The search also included reference lists and citations of the retrieved articles. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram (Figure 2.2) illustrates the results of the search process. The inclusion criteria for this search were full-text, peer-reviewed research studies, published in the English language, and focusing on pre-admission predictors of students’ success in traditional baccalaureate programs. No timeframe was set for the search, in an attempt to explore the patterns and trends in the student admission process over the years as a result of reforms or changes in nursing education. This search led to the identification of 1,020 peer-reviewed papers.

The results were screened by abstracts. As a result, 142 duplicate publications were removed from the review, and a total of 825 irrelevant articles were excluded. Another 37 articles were excluded after the full-text screening. The reason for the exclusion was that these papers were related to associate degree, diploma, or accelerated programs, or to nursing programs outside the United States. For the purpose of this review, student success was defined as in-program student achievement, program completion, and retention. Therefore, the exclusion criteria included publications that limited the definition of student success to the NCLEX passing rate or examined postadmission predictors of success.

Using a review matrix, various data from each article were extracted and analyzed, including the type of program (university/college), country in which the study was conducted, sample of the study, theoretical framework guiding the study, variables used to predict students' success, definitions of students' success, key findings, and limitations. One study, conducted by Wolkowitz and Kelley (2010), sampled both baccalaureate nursing students and associate degree students. This article was included, but only findings related to the baccalaureate students were reported. A similar strategy was applied to four articles that used the NCLEX pass rate among their outcome variables; findings related to the licensure exam were not considered, and only results related to other outcomes were analyzed for the purposes of the current study.

## **Results**

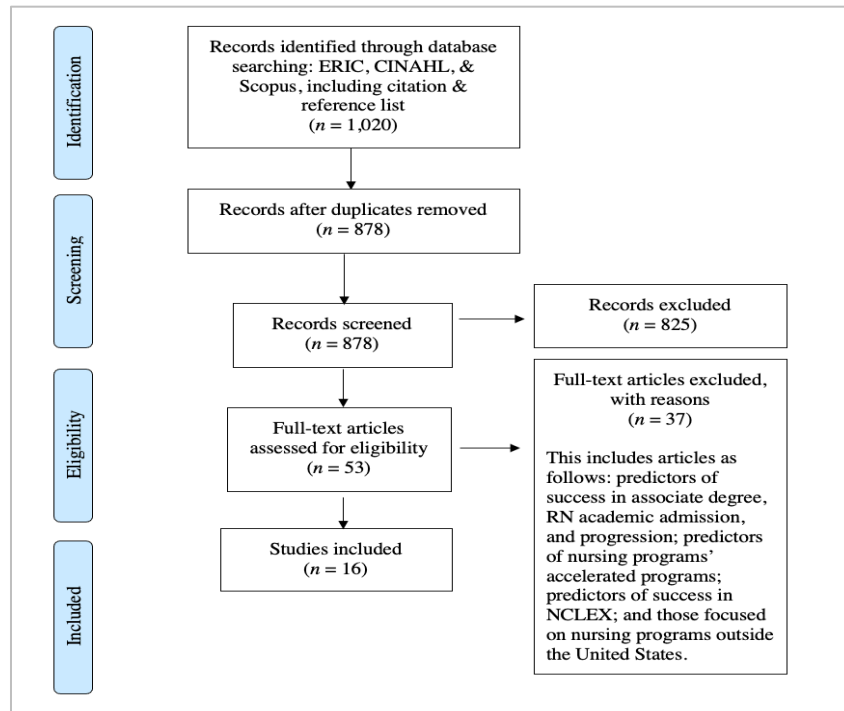
Overall, 16 articles met the eligibility criteria. All of the reviewed studies were quantitative studies, except for one mixed-method study conducted by Sadler (2003). More than half of the studies ( $n = 10$ ) sampled more than one student cohort, and two studies recruited samples from multiple programs. Because all the studies analyzed data from one entire student cohort or more, only one study conducted by Tartavouille et al. (2018), utilized power analysis to calculate the sample size needed. Few studies ( $n = 2$ ) stated the theoretical basis that guided the research study, whereas the remaining studies examined the existing admission criteria in the setting of the study or examined potential future criteria. To facilitate the analysis and discussion of this review, findings from the reviewed articles were organized into categories: students' success and the key predictors of students' success (cognitive and noncognitive predictors). A table was also created to illustrate the relationship between the identified key predictors and students' academic success in nursing programs.

### **Students' Success**

The definition of students' success in this literature review varied among studies. Collectively, there were six measures that were used to define student success: (a) early academic success defined as student academic achievement during the first and second year; (b) attrition; (c) timely completion of the program; (d) graduation; (e) performance in nursing courses measured by grade point average (GPA); and (f) academic performance in other science courses. The definition of student success varied based on the context of the study, student characteristics, and the admission and progression policy of the institution.

### **Predictors of Students' Success**

A wide range of predictors related to student success have been studied in the literature. Cognitive attributes such as pre-nursing GPA, science courses GPA, standardized entrance exams, and some noncognitive factors, particularly demographic variables, were the focus of most of the studies. Typically, the core set of cognitive predictors that were commonly used in the admission process in nursing schools were pre-nursing GPA, pre-nursing collegiate science GPA, and scores on standardized aptitude exams.



**Figure 2.2**  
*PRISMA Diagram*

## **Students' Cognitive Predictors of Success**

### ***Pre-nursing GPA***

Twelve studies focused on assessing the relationship between pre-nursing academic performance and student success in the nursing program (see Supplementary Table 1). Most of these studies referred to pre-nursing performance as college prerequisite GPA obtained by the student prior to admission to the nursing program. Publications to date have consistently found that pre-nursing academic performance (i.e., GPA) is a significant predictor of students' success, particularly with regard to graduation (Byrd et al., 1999; Strickland & Cheshire, 2017; Tartavouille et al., 2018) and timely completion of the nursing program (Herrera, 2013). Similarly, results reported by Herrera (2013) suggest that the higher a student's GPA in the pre-nursing collegiate courses, the higher the likelihood of that student's completing the program.

Other studies have examined the relationship between pre-nursing GPA and the student's GPA in their nursing courses at early phases in the program, typically measured by the student's grades in the nursing courses. These studies reported that there was a positive correlation between students' pre-nursing GPA and students' nursing GPA in the first semester (Strickland & Cheshire, 2017) and the second semester (Cunningham et al., 2014). All these studies were conducted using existing data from a single setting.

### ***Pre-nursing Collegiate Science Courses***

Along with pre-nursing academic performance, some researchers have assessed the prerequisite collegiate science GPA as a separate predictor from the overall pre-nursing GPA. The pre-admission science GPA has consistently been found to be a significant predictor of students' nursing GPA—that is, students with higher prerequisite science GPAs tend to have higher GPAs in their nursing courses (McClelland et al., 1992; Strickland & Cheshire, 2017; Wambuguh et al., 2016). These results are in agreement with other research findings in this review, which have reported that pre-admission science GPA is also a significant predictor of students' timely progression in the nursing program (Hinderer et al., 2014) and program completion (Byrd et al., 1999; Elkins, 2015; Tartavouille et al., 2018).

### ***Standardized Entrance Exams***

Many nursing schools employ one or more standardized entrance exams as a means of assessing students' preparedness for the nursing program. Some of the common exams used as predictors of students' future academic achievement are the Test of Essential Academic Skills (TEAS), the American College Testing (ACT) exam, and the HESI Admission Assessment (A<sup>2</sup>) Examination.

Nine of the reviewed studies explored the relationship between student performance on such aptitude exams and students' subsequent academic achievement in the nursing program (see Supplementary Table 1). The findings showed that scores on standardized entrance exams were associated with nursing GPA (Diaz et al., 2012; Hickman, 2005; McClelland et al., 1992; Wambuguh et al., 2016; Wolkowitz & Kelley, 2010), program completion (Tartavouille et al., 2018), and graduation (Wambuguh et al., 2016); however, there was variability in the type of entrance exams used in these studies. Notably, even studies that employed the same standardized entrance exam obtained conflicting findings. For example, both Hinderer et al. (2014) and Tartavouille et al. (2018) used HESI A<sup>2</sup> examination scores to predict students' timely completion of the program. Hinderer et al. reported that the HESI A<sup>2</sup> exam had no predictive value in relation to timely completion of the nursing program ( $\beta = .064, p > .05$ ), and that it was only weakly correlated with student nursing GPA ( $r = .31, p < .01$ ). Conversely, Tartavouille et al. found that scores on the HESI A<sup>2</sup> were actually a significant predictor of timely graduation ( $p < .05$ ), indicating that students with higher scores on the HESI A<sup>2</sup> exam were more likely to complete the program on time.

Another mixed finding related to standardized aptitude exams is the contribution of TEAS to student success. Newton and Moore (2009) conducted a study using 94 students to explore the relationship between student nursing aptitude, as measured by the TEAS score, and attrition in the nursing program, finding no correlation between the two variables. Contrarily, in an earlier study, Newton et al. (2007) concluded that the TEAS was a significant predictor of success in the first semester of the program, explaining roughly 16% of the variance in student GPA ( $F = 11.834, p = < .001$ ). Additionally, Wambuguh et al. (2016) examined 513 students from more than two cohorts and found that students' TEAS scores were a significant predictor of



graduation likelihood. The researchers also noted that students with a TEAS score  $\geq 82$  were likely to have higher nursing GPAs (Wambuguh et al., 2016). Similar findings were reported in earlier research (Diaz et al., 2012; Wolkowitz & Kelley, 2010).

Moreover, Strickland and Cheshire(2017), who investigated the use of a critical thinking standardized entrance exam and the Mayer-Salovey-Caruso Emotional Intelligence Test as a component of admissions criteria, showed there was no relationship between these exams and subsequent academic success, as measured by GPA in a fundamentals of nursing course and performance on science courses.

The students' achievement in the American College Testing (ACT) standardized exam was also addressed as a predictor of students' success in two studies. Elkins (2015) found that ACT scores were a significant predictor of student program completion, noting that students with an ACT score of 24 or higher were more likely to have a higher success rate. An earlier study conducted by McClelland et al. (1992) concluded that even ACT subtest scores of English ( $r = .37$ ), math ( $r = .3$ ), social studies ( $r = .33$ ), and natural science ( $r = .32$ ) were significantly correlated with ( $p \leq .001$ ) students' cumulative nursing GPA.

Of the nine studies examining standardized test performance, only one study advocated for the use of a sound psychometric formula to calculate the value of each predictor. Cunningham et al. (2014) explored the use of a statistically based formula to select students; however, the four predictors used in the formula were pre-nursing GPA, science GPA, ATI-TEAS examination score, and the number of completed prerequisites, all of which are based on academic aptitude. Although these cognitive predictors are often associated with nursing students' success and also related to program outcomes, noncognitive predictors are also important and can influence student outcomes.

## Noncognitive Predictors of Students' Success

Non-cognitive variables are not used as admission criteria; nonetheless, the contribution of non-cognitive factors to students' success is well documented (Shulruf et al., 2011). Five articles addressed the noncognitive variables that affect student success. Demographic, non-modifiable variables such as age, gender, and ethnicity were some of the common non-cognitive variables assessed in this review of the literature. Findings were mixed as to whether these variables were critical predictors of student success. While, in some studies, age, gender, and ethnicity were significant predictors, they were not significant in other studies. For example, in a study of 149 undergraduate nursing students, Tartavouille et al. (2018) found that older students (defined as those 22 years or older) were less likely to complete the nursing program on-time ( $B = 1.05, p < .05$ ). Similar findings were reported in an earlier study by Byrd et al. (1999), who concluded that age was a significant predictor of students' graduation; the older the student was upon entry to the nursing program, the lower the potential for student success, as defined by timely progression in the program. Conversely, Ott et al. (2018) studied a sample of 4,512 nursing students from seven different cohorts to identify variables associated with success in the first year of the nursing program and reported that students' performance in the nursing courses did not vary based on age.

Furthermore, Herrera (2013), who studied the patterns of selection, retention, and graduation in 584 nursing students, explained that Hispanic and Black students were less likely to graduate within the required period when compared with other (nonminority) students. These findings were in line with other studies that have concluded that nonwhite students are less likely to graduate on time (Byrd et al., 1999; Tartavouille et al., 2018). In respect to gender difference and student success, Herrera (2013) noted that timely completion of the program was lower

among male students (by a rate of .223) compared with females, and that the likelihood of completing the program in time was significantly lower among Black and Hispanic students compared with other racial groups (Herrera, 2013). In contrast, Diaz et al. (2012) sampled 174 Hispanic students to identify the predictors of early success in the undergraduate nursing program among Latino students and concluded that gender was not a contributing variable in the prediction of student academic achievement in the nursing program (Diaz et al., 2012). Here, it is important to note that, in the Diaz et al. study, the samples were small, relatively lacking in diversity, and had a disproportionate ratio of females to males in the program.

### **Theoretical Basis for Students' Success**

As mentioned earlier, only two publications indicated the theoretical underpinnings of the selection criteria or variables under study. Bennett et al. (2016) used the Model of Geometric of Student Persistence and Achievement by Swail (2004), which highlights the factors that contribute to students' persistence and academic achievement. This model consists of three constructs that influence student academic experience: (a) student cognitive abilities, (b) social factors, and (c) institutional factors. Elkins (2015) used Seidman's retention theory, which focuses on identifying students who are at risk for failure at early stages of the program; this theory emphasizes the importance of employing early intervention to retain and support students.

## **Discussion**

### **Measures of Students' Success**

Although the prediction criteria varied across studies, there was consensus on five common outcomes, regardless of the study. These outcomes were graduation, attrition, timely program completion, students' academic achievement in the first two years of the nursing program, and nursing GPA upon program completion. Two outcomes require further

examination in relation to their value and implications in nursing education: timely program completion and the use of GPA (e.g., nursing course GPA). First, although program completion is a critical outcome for evaluation, Wambuguh et al. (2016) argued that investigating outcomes at an early stage of the program might be more fruitful for both the students and the program. For example, identifying students potentially at risk for failing allows for intervening with support measures to promote progression and prevent failure (Wambuguh et al., 2016). Second, the potential grade inflation and variability in course rigor and quality makes the inclusion of GPA as a variable problematic (Bennett et al., 2016). This problem is applicable to both the use of GPA as an outcome variable (e.g., nursing courses GPA) or as a commonly used predictor variable (e.g., pre-nursing GPA and science course GPA).

### **Students' Cognitive Predictors of Success**

A variety of variables associated with nursing student success have been examined in the literature over the last three decades. The most prominent variables in this review were (a) pre-nursing GPA, (b) pre-nursing science GPA, and (c) aptitude-based entrance exams.

Clearly, no single predictor is sufficient to guide the selection criteria for recruiting academically qualified students. Instead, studies have examined a set of criteria to predict students' academic success in the nursing program. Regardless of the selected predictors, Cunningham et al. (2014) argued that non-psychometric approaches to student admission—such as those that include interviews or involve a review committee that ranks the participants according to a set of predictors—are not only time- and labor-intensive but also inherently subjective in selecting potential students. Hence, using statistically designed formulas based on a rational point score offers a more reliable and valid selection process. Moreover, while evidence shows that students' history of academic achievement (e.g., pre-nursing GPAs and science

course GPA) is a significant predictor of students' future academic success, given the variability in school contexts, it is unclear whether GPA is a reliable measure, and, if so, it is most likely not comparable across settings (Salvatori, 2001). The uniqueness of different student populations and the differences in program philosophy and institutional context—coupled with the quality and rigor of the courses and, thereafter, the awarded GPA—are all important considerations when interpreting such data (Newton et al., 2007). Hence, the interpretation of pre-nursing prerequisite GPAs and their impact on subsequent academic achievement should be done with caution.

When examining standardized pre-entry exams, the review revealed mixed results regarding the predictive value of HESI A<sup>2</sup> exam scores in relation to student success (as defined by timely completion of the program). With the exception of predicting student attrition, TEAS exams showed more consistent positive results in studies where the TEAS exam was examined as a predictor of student success in the first semester, student nursing GPA, and graduation. In part, this can be explained by the variability in the predicted outcomes tested across the literature, which prevents the possibility of comparison across studies. It is worth mentioning that, although standardized aptitude exams can offer consistency across different programs and can be effective in screening for students who will be more likely to progress through the program and pass NCLEX on the first attempt (Hinderer et al., 2014; McClelland et al., 1992), they have not been successful in contributing to one of the most important emerging objectives in nursing education—promoting diversity in nursing student populations (Wambuguh et al., 2016). As for the use of GPA, critically analyzing the reviewed articles requires that the findings must be reviewed with caution, particularly when drawing conclusions about the reliability and validity of the variables. As highlighted earlier, the variability between the programs and the

educational pedagogy means that the interpretation and the value of GPA can vary from one program to another, as well as depend on the number of prerequisites a student has taken (Salvatori, 2001).

Clearly, quantitative variables such as student GPA and standardized test scores have long been used to gauge the prospects of students applying to nursing programs. The study conducted by McClelland et al. (1992) and Byrd et al. (1999) were the oldest studies to predict the relationship among student pre-nursing science GPAs, student standardized test scores, and subsequent academic performance in nursing. In the wake of a lack of diversity within the nursing workforce, recent studies have called for the need to adopt alternative admission measures to the quantitative model to promote student diversity and mitigate student attrition (Bennett et al., 2016). Some former studies on the rational admission model that takes into account student resumes, personal statements, and interviews, revealed that the quantitative model for student selection offered better prediction of subsequent academic achievement (Billows, 2007; Cunningham et al., 2014).

### **Noncognitive Predictors of Students' Success**

Despite the consensus that both cognitive and non-cognitive variables are vital to the process of selecting a potentially successful nursing student, many articles in this literature review drew upon only cognitive variables. Fewer publications addressed the contribution of common demographic variables to students' academic success; these publications examined limited variables, such as age, gender, and ethnicity (Byrd et al., 1999; Herrera, 2013; Tartavouille et al., 2018). Although these variables are considered nonmodifiable variables and are not legitimate admission criteria for selecting students, exploring the contribution of such variables to students' academic performance might offer insight to help establish appropriate

academic support for at-risk students (Tartavouille et al., 2018) and tailor the needed financial aid to ultimately support increasing the diversity of the student population (NLN, 2016).

Realizing the importance of diversity, many health education programs, including nursing, are experiencing a promising shift in admission practices toward a holistic admission approach, one that includes evaluating nonacademic variables such as personal qualities in addition to student academic variables (Wambuguh et al., 2016). Nonetheless, the progress in this area remains slow and limited. Additionally, as mentioned earlier, such admission strategies are time and labor intensive. Concerns have also been raised that the limited published evidence does not offer a clear understanding of how the admission practices in nursing programs are influencing student cultural, ethnic, racial, and socioeconomic representation in nursing programs (Glazer et al., 2014).

### **Theoretical Basis for Students' Success**

Prediction of students' success has been long studied, and empirical evidence has attributed cognitive and non-cognitive variables to students' academic success. All the studies included in this literature review contributed to the body of knowledge by providing evidence for potentially valid variables that contribute to student success; nevertheless, the theoretical underpinnings that guide the research inquiry should not be ignored. The exploration of theoretical knowledge ultimately frames students' success and its correlated factors across a range of contexts, which is inherently valuable for advancing research on student success. It is also important to recognize how schools translate theory and research into practice to increase the capacity for promoting student success (Tinto, 2007). Unfortunately, recent studies have indicated that most of the employed methods of student selection lack the evidence-base to support students' selection approaches (Gale et al., 2016). A similar concern was echoed by

Tinto (2007), who reported the presence of a research–practice gap in relation to student retention, graduation, and success.

### **Conclusions**

This paper presented a review of 16 articles from three primary databases. The reviewed studies operationalized students' success in different ways, each of which was relevant to the context of the study's setting and its aims. As noted in this review, the majority of the studies used large sample sizes; however, the studies were often conducted in a single institution and used a convenience sample. Therefore, the generalizability of the findings is confined to the studied population. That being said, nursing programs differ in their curricula, educational philosophies, entry requirements, and student population characteristics. This makes it critical that each school examine its particular student population within its unique context to determine the best predictors of students' success.

It is also important to emphasize that, in the process of completing this review, there was a large body of literature examining predictors of students' success in non-traditional nursing programs and associate degree programs. In addition, the outcome of passing licensure exams highly dominated the literature, particularly for studies conducted in the United States; however, the focus of this paper was on 4-year baccalaureate nursing programs and predictors of in-program student success. Notably, the quantitative student selection model using cognitive variables continues to dominate the admission process in nursing schools. Given the pressing trends in nursing education and student diversity, along with the limited educational resources and high rates of attrition, effective admission selection criteria and their relation to student success continue to be an important area of research. Nonetheless, this review suggests that it is challenging to isolate a single variable as the best predictor of student success; however, the use



of a combination of variables may offer more reliable prediction. In the future, more studies should consider using a theoretical basis to guide research inquiries. Additionally, researchers should examine admission variables that are potentially relevant across a variety of programs. Continued research in this area can help nursing schools strike a balance between using academic predictors and incorporating non-cognitive or nonacademic student factors in their admission policies without compromising the need to bring qualified applicants into nursing programs.

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## **Educational Environment and Student Success**

While the aforementioned studies indicated that students' academic achievement before entering a nursing program is among the primary factors that promote student success in a nursing program, factors of the educational environment are largely overlooked. This limited form of evaluation that focuses on program inputs (i.e., student characteristics and their academic outcomes) is incomplete. An inadequate input–outcome evaluation does not answer why a program's outcomes may be improving or declining or what can be done about it (Astin, 2012).

### **Factors Related to Student Success**

Students' learning experiences and academic performance are influenced by multiple contextual factors, including the curriculum, faculty members, clinical preceptors, assessment quality, clinical placement quality, students' ability to assimilate classroom knowledge into a clinical setting (Malwela et al., 2015), and students' characteristics (Astin, 2012; Jeffreys, 2015; Rogers, 2010).

Rogers (2010) reported that both graduates and faculty members agreed that student-related factors (study habits, organization, and student motivation), collaboration (communication with faculty, social support systems, and faculty involvement), and curriculum-related factors (teaching approach and practice questions) could facilitate student success. Cospier and Callan (2018) reported similar findings in a study in which students and faculty members stated that curriculum organization, instructional strategies, and faculty support are important to students' success. Moreover, interpersonal factors such as time management and the motivation to succeed were also found to be significant contributors to their success.

Studies conducted in settings outside the United States have shown that institutions' structural factors are among the common barriers to students' success and satisfaction. Some of

the environmental factors that hinder student success include inadequate learning facilities, poor student–staff communication, ineffective teaching strategies, curriculum inadequacies (Alshammari et al., 2018), lack of study spaces in the library, poor Internet connections, lack of access to required books, and insufficient technical support (Pinehas et al., 2017). Some students also indicated that incivility between students and faculty members—especially some negative behaviors by students—affected their educational experience (Pinehas et al., 2017).

In a study conducted at a nursing school in South Africa, students perceived supportive student–staff relationships, technological support, and adequate learning resources as enabling academic success (Dube & Mlotshwa, 2018). On the other hand, students believed that the use of English as the language of instruction was a barrier to good academic performance (Dube & Mlotshwa, 2018). Tharani et al. (2017) found that high academic expectations related to academic workload not only overwhelmed students but also affected their academic performance.

Drawing on the literature, there are a variety of student inputs that interact with the educational environment factors, which, as a result, affect student success. These inputs include student academic characteristics (Strickland & Cheshire, 2017; Wambugh et al., 2016), student demographics (Jeffreys, 2015), and personal factors such as motivation and study habits (Cospers & Callan, 2018; Rogers, 2010). Hence, this mixed-methods study will explore factors that influence student success, including student characteristics and educational environment factors. Such a study can offer a holistic evaluation of an educational program, a focus on students’ success.



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## Chapter 3

### Research Design and Methods

#### **Purpose**

This study is a sequential, explanatory, mixed-method evaluation study to examine the factors that affect student success at the OCHS in four stages: (a) conducting a retrospective analysis to determine the relationships among student demographics, academic characteristics, and nursing student success at Oman College of Health & Sciences; (b) using a cross-sectional approach to assess nursing graduates' satisfaction with the quality of their educational environment using the Undergraduate Nursing Student Academic Satisfaction Scale (UNSASS); (c) examining the association between alumni satisfaction and their academic achievement using statistical analysis; and (d) explaining and expanding on quantitative data by giving graduates a voice with which to share their lived experience on what factors enabled or hindered their success (Creswell & Plano Clark, 2018).

#### **Specific Aims and Research Questions**

The primary purpose of this mixed-methods evaluation study is to examine the factors that influence Omani nursing student success in the OCHS. Six research questions will be addressed.

##### ***Specific Aim 1***

Examine student success rates by identifying the student retention rate, attrition rate, and success rate for the cohort graduating in 2018.

##### ***Research Question 1***

What are the student success rates, as defined by student retention, attrition, and success rates, for the nursing graduates of 2018?

### ***Specific Aim 2***

Examine the relationship between students' high school English test scores and their cumulative GPA at the end of the GFP as well as at the end of each year in the nursing program.

### ***Research Question 2***

What is the relationship between students' high school English test scores and their subsequent GPA, at the end of both the GFP and each academic year in the nursing program?

### ***Specific Aim 3***

Explore the relationships among the current admission criteria (final test scores in biology and chemistry as well as student demographics), on-time completion of the program, and cumulative GPA at the end of each year in the nursing program.

### ***Research Question 3***

What is the relationship between the student demographics, the current admission criteria used by the OCHS, student on-time completion of the program, and cumulative GPA at the end of each year in the nursing program?

### ***Specific Aim 4***

Examine the relationship between students' achievement in GFP and students' subsequent results in the nursing program (according to their nursing GPA at the end of year).

### ***Research Question 4***

To what extent can a student's achievements in the GFP be used to predict their GPA at the end of each academic year in the nursing program?

### ***Specific Aim 5***

Identify the criteria that best predict student achievement at different points during a student's academic trajectory.

### ***Research Question 5***

What are the best predictors of student academic achievement in the context of the OCHS?

### ***Specific Aim 6***

Explore students' perceptions of factors that can affect their academic success.

### ***Research Question 6***

What factors do OCHS nursing graduates perceive as contributors or hindrances to student success?

## **Significance of the Study**

In the context of the OCHS and the various identified issues related to its admission policies, student preparedness for an English nursing curriculum, and recommendations to improve the educational environment, this study could contribute to improving the program in various ways. First, tracking student progression and program completion will offer empirical evidence to guide the development of selection criteria that are best suited for the program's rigor. Second, tracking such data will generate a better understanding of when student progression issues occur and the factors in the program that enable or hinder one's progression. Third, the findings can inform data-driven interventions for quality improvement. Fourth, such research can help faculty and school leaders to identify students who are at risk of failure in the early stages of the program and implement measures to support these students.

## **Theoretical Framework**

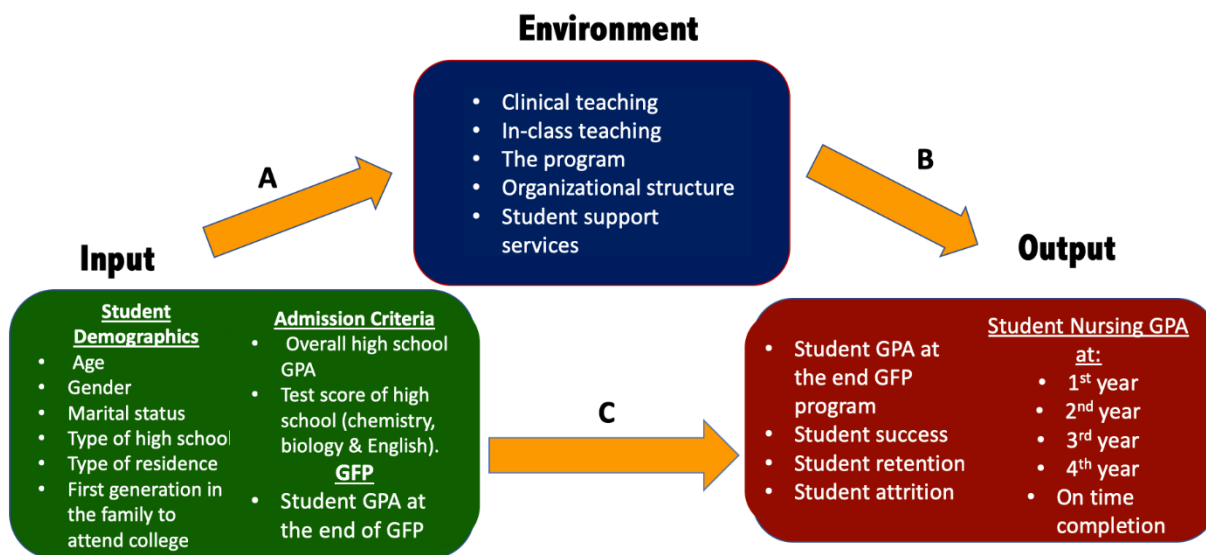
This study draws upon Astin's input–environment–output (I-E-O) model (See **Figure 3.1**). The model consists of three main constructs to help explain student outcomes. The *input* refers to the students' characteristics at the time of entry into the program. This construct

involves demographic data (e.g., age, gender, language spoken at home, marital status, parents' level of education, and whether the student is the first generation in their family to attend college), cognitive attributes (as indicated by college GPA, admission test scores, or precollege GPA), the students' aspirations and expectations, and the students' behavioral patterns (e.g., time spent studying, social interaction with peers, smoking and drinking habits, and student interaction with faculty members) (Astin, 2012). The *environment* encompasses the factors involved in the students' educational experience throughout the program. These factors include program personnel (e.g., faculty member characteristics and qualifications), structural characteristics of the institution (e.g., the size of the institution and of learning facilities), teaching practices, overall student body composition, student support services (e.g., orientation programs, remediation, and counseling), and program selectivity (i.e., the program's recruitment and admission policies). The *output* is defined as the outcomes, results, or consequences of the *input* and the *environment*.

The pathways (A, B, and C) illustrate the relationship between the model concepts, in which input is directly correlated with the output and mediated by the environment. For example, both the input and environment can be identified as independent variables (Astin, 2012). The I-E-O model provides meaningful insight into how education outcomes are influenced by a combination of factors composed of students' characteristics and their institution's characteristics (e.g., the educational policies, the curriculum, program processes, and institutional climate).

### **Figure 3.1**

*The Input-Environment- Output (I-E-O) Model*



Note. Adapted from *Assessment for Excellence: The Philosophy and Practice of Assessment in Evaluation in Higher Education*, by A. W. Astin and A. L. Antion, 2012, Rowman & Littlefield Publisher. Copyright 2012 by Alexander W. Astin and Anthony Lising Antion.

For this study, the input includes the following student demographics: age, gender, marital status, type of high school attended, residential arrangement during studies, and academic characteristics upon entry to the program. Students' high school GPA and test scores in chemistry, biology, and English will be included as past academic achievements. For the environment, the study will focus on six key areas of the educational environment: clinical teaching, faculty in-class teaching, program, student support services, and program design and delivery. The outputs include attrition rate, retention rate, on-time program completion, and students' GPA at the end of the GFP and at the end of each year in the nursing program.

## Measures

### *Quantitative Phase: Part 1*

Part 1 of the quantitative phase included two sets of independent variables: student entry criteria and student demographic profiles. Four key independent variables composing the admission criteria were extracted from the student academic records: student scores in three high school courses—English, chemistry, and biology—and the student’s average high school grade. The student demographic profile, which was obtained via a questionnaire, included (a) the type of high school attended; (b) type of living arrangements during their college years; (c) student age upon admission, (d) marital status; (e) whether they were the first generation to attend college; and (f) course failure during the program (history of failure: yes/no).

The dependent variable for this study was student success, defined by six variables: (a) student scores in the GFP English Level-3 course, (b) cumulative grade point average (CGPA) at the end of each year in the nursing program, (c) success rate, (d) attrition rate, (e) retention rate, and (f) on-time completion of the program.

### **Glossary Terms**

For the purposes of this study, the dependent variables are operationally defined as follows:

- Student success refers to the student’s ability to successfully complete the nursing program within the legal timeframe (12 semesters, per the OCHS) by taking all of the required courses sequentially, with no history of failure or course retake (Jeffreys, 2007).
- Attrition is defined as students leaving the program at any point of their trajectory because of academic failure or dismissal based on academic policies (involuntary attrition) or because of personal reasons—that is, voluntary attrition (Jeffreys, 2007).



- Retention is achieved by students who progress sequentially and complete all of the courses required to graduate but with an academic record of failure or retaking at least one course (Jeffreys, 2007).
- Science course achievement is the student's scores in high school biology and chemistry courses.
- English Level-3 achievement is the scores a student obtained in their final English course in the GFP.

### ***Quantitative Phase: Part 2***

For Part 2 of the quantitative phase, the Undergraduate Nursing Student Academic Satisfaction Scale (UNSASS) was used to measure graduate satisfaction regarding the quality of their educational environment. This survey consists of 48 closed-ended statements on a 5-point rating scale (1 = strongly disagree, 2 = disagree, 3 = somewhat agree, 4 = agree, 5 = strongly agree). The survey was designed and evaluated by Dennison and El-Masri (2012; Appendix B, for the detailed UNSASS).

The 48 items on the UNSASS are divided into four subscales that address the educational environment: (a) clinical teaching (15 items), (b) faculty in-class teaching (16 items), (c) program design and delivery (12 items), and (d) student support services (five items). The total composite of each subscale can be obtained by summing the points for each response (Su, 2013). The survey's psychometric properties show a content validity index of .83 and test-retest reliability of .88, indicating that the survey is a reliable measure of students' satisfaction with their educational environment. The overall Cronbach's alpha (.96) suggests that the UNSASS has excellent internal consistency (Dennison & El-Masri, 2012). Thus, the UNSASS has been utilized to assess students' satisfaction during nursing programs (e.g., Freeman et al., 2017;

Omer, 2016; Su, 2013) as well as student satisfaction after completing a program (e.g., Taylor, 2012).

For this part of the study, the independent variables were the students' graduating GPA (cumulative GPA) and student history of course repetition (history of failure: yes/no), and the dependent variables included the mean satisfaction of the four domains of the UNSASS.

### ***Qualitative Phase***

Individual interviews were conducted using semistructured, open-ended questions. The questions focused on eliciting student perception about factors that facilitated or hindered student success in the nursing program. The guide for the semistructured one-on-one interviews is included in Appendix C.

### **Study Setting**

The institution in question consists of nine nursing campuses in different locations. These institutes recently merged other Ministry of Health Education institutes (Health and Sciences and the Oman Assistant Pharmacy Institute) with the OCHS. The students admitted through the Higher Education Center undergo the yearlong GFP and then progress to their respective programs—to nursing or other applied health programs.

The annual student intake in the nursing program is approximately 350 to 400 students. Applicants must attain a minimum of high school average score of 65 and a minimum score of 60 in their high school English, biology, and chemistry courses. All high school students are required to complete a 1-year program involving intensive English courses, study skills, mathematics, and information technology. After completing the program, the students will progress to their prospective fields. All nursing campuses run the same nursing curriculum and use a centralized assessment. Students are enrolled in the nursing programs as full-time students

and progress through the program as cohorts. The program reports student achievement using a credit hour system and GPA (Directorate General Education of Training, 2012).

## **Sampling**

The target population includes graduates who were admitted to the OCHS in the 2013–2014 academic year and graduated summer of 2018 ( $N = 378$ ). Student records missing high school entry data ( $n = 64$ ) were excluded from the study.

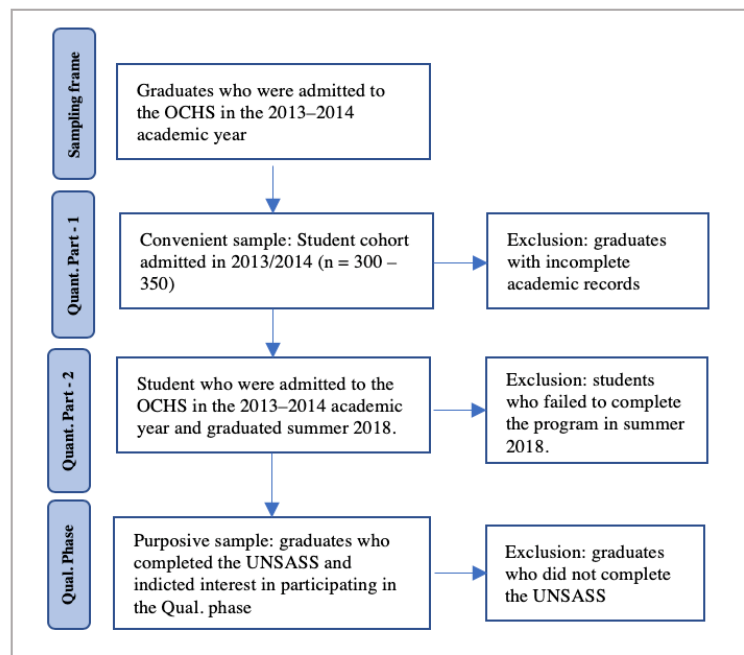
In the quantitative phase, the principal investigator (PI) followed nonprobability sampling using a convenience sample. A convenience sample is one of the most common sampling techniques in social science and education research for examining the relationships between variables and the differences between groups (Gliner et al., 2017). Therefore, for the first part of the quantitative phase, the target sample included the academic records of all of the students who were admitted to the nursing program at the OCHS in 2014. For the second part of the quantitative phase, only students who completed the program and graduated in summer 2018 ( $n = 372$ ) were invited to complete the Undergraduate Nursing Student Academic Satisfaction Scale (UNSASS). Students who failed to graduate within the designated program timeframe were excluded from this part and from the qualitative phase of the study. Excluding these students will ensure that the study captures the experiences of students who are at the same stage of their trajectory, namely exiting the nursing program and transitioning to employment.

For the qualitative phase of the study, a purposive sample ( $n = 11$ ) was obtained using a maximal variation strategy. According to Creswell and Poth (2018), a sample size of 3–10 participants is required to achieve rich data that are relevant to answering the research questions. Nonetheless, data saturation is recommended as a rule of thumb in justifying the sample size in qualitative studies. Thus, for this study, the number of participants was determined by achieving

data saturation, whereby the data-gathering process no longer produces new ideas or generates new insights (Creswell & Poth, 2018; Dworkin, 2012). Following this sampling strategy allowed the PI to select participants based on their gender, living arrangements during college, entry criteria (i.e., mean high school grade), grade point average (GPA) upon graduation, and history of failing during the nursing program. This form of sampling also ensured adequate representation of graduates from different campuses, which substantiated the collected data (Creswell & Plano Clark, 2018). **Figure 3.2** illustrates the sampling process.

**Figure 3.2**

*The Sample-Selection Process*



***Inclusion and Exclusion Criteria***

The entire student cohort admitted in 2013/2014 was included for the quantitative phase. Nursing graduates missing entry data in their academic records ( $n = 64$ ) were excluded from the first part of quantitative phase. For the second part of the quantitative phase, only those who

graduated within the required timeframe—by summer of 2018 ( $n = 372$ )—were included in both the second part of the quantitative phase (the survey phase) and the qualitative phase.

### ***Participant Identification and Recruitment***

The participants were selected from the school records of the OCHS. After obtaining approval from the Ministry of Health, the Directorate General of Planning and Studies, and the University of Missouri Institutional Review Board to access the records, the PI obtained permission from the OCHS Research Department to retrieve students' academic record data. An administrative assistant from the Academic Affairs Department at the OCHS was hired to compile all student academic data into one file, de-identify the files, and assign the new codes or identifiers to the data set.

For the survey component of the study, the students who completed the program in 2018 were tracked with the assistance of the Directorate General of Nursing Affairs (DGNA) at the Ministry of Health. The DGNA is responsible for the graduates' employment and for the 6-month residential programs of newly appointed staff. The DGNA assigned a nurse educator from each hospital as the point of contact to coordinate with the PI and assist in disseminating the survey to the graduates.

### ***Subject Retention and Attrition***

Upon completion of the survey, the subjects were directed to a link to enter a drawing for an iPad. Subjects who were interested in entering the drawing were prompted to enter their name and phone number. The incentive was stated in the invitation and announcement flyer for the study. The subjects were reassured that the entry form was not connected to their survey response submission. The graduates who participated in the one-on-one interviews were given a prepaid phone credit worth 1 Omani rial as an incentive for their time.

## **Data Collection**

### ***Quantitative Phase: Part 1—Student Academic Records***

After obtaining permission from the OCHS research department and ethical clearance, the PI sent an email to the associate dean of academic affairs and the associate deans of the satellite campuses, including an overview of the study, the required data, and related the approval to conduct the study. The OCHS nursing school usually saves students' records in Microsoft Excel spreadsheets. Encrypted spreadsheets were emailed to the hired administrative assistants. The following data were obtained from student records: (a) overall high school average score, (b) student scores in high school courses (i.e., chemistry, biology, and high school English), (c) student achievement in English Level-3 (d) CGPA at the end of each academic year of the nursing program (i.e., CGPAYear-1, CGPAYear-2, CGPAYear-3, CGPAYear-4).

### ***Quantitative Phase: Part 2—UNSASS Survey***

The participants were in the final week of a 6-month internship in various healthcare facilities. The survey was disseminated with assistance of DGNA, which assigned a nurses educator from each hospital as a contact person to the PI. Pre-scheduled internship meetings were used to brief participants about the survey via hard-copy information sheet that included a Qualtrics link to the survey. The clinical educators coordinating the internship program also shared the information sheet was also shared via WhatsApp groups. The graduates were given time to complete the survey during internship meetings or anytime within the next 30 days. Participants took approximately 20 to 30 minutes to complete the survey. A brief demographic questionnaire was also included in with survey. The data collected from this questionnaire included: (a) age on admission, (b) gender, (c) marital status during the course of the program, (d) type of high school attended, (e) type of living arrangement (e.g. home, dormitory), (f) first

generation to attend college status, (g) CGPA on graduation, (h) history of failure or course repetition (yes/no), and (i) campus affiliation (See demographic questionnaire, Appendix A). Student ID was also collected to match the demographic questionnaire with student academic record. To ensure participants' confidentiality, students' IDs were replaced by a surrogate code in the final data set after the matching process.

### ***Qualitative Phase***

At the end of the survey, participants were directed to a link to register their interest in participating in one-on-one interviews and to obtain brief information about the second phase of the study. Participants who were interested were asked to enter their preferred communication method (phone number or email address). An invitation to participate in the second phase, along with the information sheet, was sent to the participants who indicated interest in being interviewed. To ensure diversity of the sample, respondents to the invitation were selected based on gender, campus affiliation, graduating GPA, history of failure in at least one course during the program, and type of living arrangement during college period. A Zoom meeting was scheduled with each respondent. During the meeting, the PI explained the interview procedure and provided the participants an opportunity to ask any questions that they had. The PI also reiterated the participants' right to withdraw from the study at any time with no penalties. Participants were informed that the one-on-one interviews would be conducted and recorded via Zoom and were anticipated to take approximately 30 minutes. Consent was obtained from participants; those who consented to the interview process were scheduled for an interview date (See Appendix C for detailed consent). A reminder email was sent 24 hrs prior to the interview. A qualitative researcher, who is on staff at OCHS but not involved in teaching, conducted the interviews. Selecting a nonfaculty researcher to conduct the interviews ensured that graduates felt

comfortable expressing their opinions and would not withhold any negative experiences due to fear of power imbalance (i.e., in the faculty–student relationship). It also helped minimize potential bias related to the PI’s preconceived assumptions about the educational environment at OCHS from past work experience in the same institution.

The interview questions focused on three topics: (a) What preadmission academic experience enhanced or hindered student success in nursing? (b) What program and personal factors facilitated or hindered participants’ success in the GFP and nursing program? (c) What program changes were likely to enhance students’ learning experience and academic achievement? Table 2 in Appendix F lists all of the questions used in the interview. An expert reviewed these interview questions and evaluated them to ensure question clarity and congruence with the research questions. The PI determined the number of interviews through data saturation (i.e., when no new ideas or themes emerge from interviewees; Young & Casey, 2019).

## **Data Management**

### ***Quantitative Phase***

**Data from Student Academic Records.** The PI and the hired administrative staff merged all academic records ( $N = 375$ ) received from the satellite campuses into one document. Sixty-four records were missing all the student entry data and the English placement test scores and were therefore omitted from the study. Data extracted from student records were students’ entry qualifications (i.e., overall high school average scores, student high score in biology, chemistry, and English), student score in English Level-3, and student CGPA at the end of each year in nursing. The academic data was then matched with demographic questionnaires. The PI cross-checked the data to ensure the accuracy of matching. A total of 276 records were matched.



After the matching process, the data were anonymized, and a unique code was assigned to each participant to maintain confidentiality. Campus affiliation was also coded.

Various records were missing student grades on some GFP courses and, as a result, calculating student GPA at the end of GFP was not possible. Therefore, student achievement in English Level-3, the final core course in GFP, was used as an indicator of student achievement at the end of the program. Additionally, after examining the student achievement in GFP courses and consulting a statistician, it was clear that student achievement in other GFP courses, such as IT and math, was 75 points or above, indicating that these courses were not core courses and were not determinants of student progression.

All the categorical variables were dummy coded as follows: gender (*male* = 0, *female* = 1), type of high school attended (*governmental* = 0, *private* = 1), marital status (*single* = 0, *married* = 1), first generation in the family to attend college (*yes* = 0, *no* = 1), and type of living arrangement (*home* = 0, *dormitory* = 1, *home and dormitory* = 2). According to the reports by graduate, there was only one participant who attended private school. Therefore, type of school attended was not included in the analysis.

**UNSASS.** The data from the survey was exported from Qualtrics into an Excel sheet and were inspected for missing data. A summary table of rates of missing data for both variables and cases was created to identify the frequency and the pattern of missing data (Mackinnon, 2010). According to Schlomer et al. (2010), some researchers have suggested that a missing data rate of 20% can bias the results. Overall, two key approaches to handling missing data are commonly used: the first method is case deletion (e.g., listwise deletion and pairwise deletion), in which the researcher simply discards the cases with incomplete information; and the second approach is the imputation-based method, which involves replacing the missing data with imputed values

(Cheema, 2014). In this study, 339 surveys were complete, and only 12 surveys were missing more than 50% of the data. As the number of incomplete surveys did not affect the sample size, they were excluded from the data set.

## **Data Analysis**

### **Quantitative Phase**

#### ***Part 1: Student Academic Records***

The data were exported into SPSS version 25 and analysis was conducted to answer the research questions as follow:

**Research Question 1.** To calculate student retention, attrition, and success rates, descriptive analysis was used to identify the number of students who completed the program within the timeframe and with no history of failing any courses, the number of students who experienced failure in at least once course, and the number of students who were dismissed or left the program voluntarily. We relied on the data reported by the graduates in the demographic survey regarding history of failure.

**Research Question 2.** Pearson correlation was conducted to identify the relationship between students' scores in their high school English course and their subsequent GPAs at the end of the GFP and each academic year in the nursing program.

**Research Question 3.** Two rounds of multiple regression analysis were conducted to determine the relationships among the student demographics, the current admission criteria used by OCHS, student on-time completion of the program, and student cumulative GPA at the end of each year in the nursing program. In the first regression model, student entry data (high school average score, biology score, chemistry score, and high school English scores) were used as the independent variables and CGPA at the end of each year in the nursing program were the

dependent variables. In the second regression model, student demographics were the independent variables, whereas student GPA at the end of each year in nursing was the dependent variable.

**Research Question 4.** Linear regression was conducted to determine the extent of which student's achievements in English Level-3 be can be used to predict the student's GPA at the end of each academic year in the nursing program. As mentioned earlier, student score in English Level-3 was used to denote student achievement in GFP.

**Research Question 5.** Multiple regression was used to identify the best predictors of nursing student academic achievement in the context of OCHS. In the model, the student entry criteria, demographics, and student achievement on English Level-3 were used as the independent variables, and student CGPA at end of each academic year of the nursing program were the dependent variables. Bonferroni correction was included in the analysis. This procedure accounts for the number of regressions conducted and involves adjusting the alpha level to control for type I errors (Lomax & Hahs-Vaughn, 2012).

### ***Part 2: UNSASS Analysis***

**Research Question 6.** To address which factors OCHS graduates perceive as contributors or hindrances to student success, descriptive analyses were conducted to examine the satisfaction rate and the mean satisfaction for each domain of UNSASS. Pearson correlations were conducted to explore the relationship between graduates' mean satisfaction and each student's graduating GPA. Furthermore, an independent t-test was utilized to assess the difference in mean satisfaction between students who failed in at least in one course versus students who experienced no failure during the course of the program.

### **Qualitative Phase**

Following each interview, the PI transcribed and narrated each interview verbatim. After reading the transcripts and developing an understanding of the ideas presented in the data, the PI created memos covering any emerging concepts or ideas across the multiple transcripts (Creswell & Poth, 2018). After reading and rereading the transcribed interviews, the PI performed minor language editing to ensure clarity of the ideas expressed. Following the member checking strategy, the transcripts were then emailed to the participants to review the language correction and ensure that the transcripts still reflected their responses. Participants were also given the opportunity to add to or elaborate on the content of the interview (Meo-Jaffe, 2011).

After the participants' provided feedback on the transcripts, NVivo software was used for the data analysis. The data were then analyzed following structural and evaluation coding for the first cycle and pattern coding for the second cycle to summarize the codes into categories or themes (Saldana, 2016). In the first cycle, data were coded into segments, based on the concepts addressed in the interview questions (e.g., pre-admission factors, GFP factors, personal factors). Each segment was also assigned a non-quantitative code (+), indicating that a segment was perceived as a contributor to student success or code (-), implying that the coded segment was a hindrance to student success. The second cycle of analysis, pattern coding, helped identify the commonalities between the previously generated codes and assigned them to categories or themes (Saldana, 2016).

The PI maintained a logbook, describing the coding process and the decision made to achieve the end-product of analysis. Such comprehensive documentation presents an audit trail and enables an external audit (Creswell & Poth, 2018). Following the PI's coding process, a qualitative expert cross-checked the coding process to ensure accuracy, quality, and consistency. After the peer review, a summary of the findings, including examples of participants' quotations,

was shared with interviewees to elicit their feedback on the findings and interpretation (Korstjens & Moser, 2018). The generated code and themes from both coding cycles were re-read to solidify the understanding of students' views and the connections among the themes (Creswell & Poth, 2018).

### ***Trustworthiness***

Trustworthiness is an umbrella term to describe qualitative research quality and to guide the researcher in generating persuasive and valid findings (Plano Clark & Ivankova, 2016).

There are four common criteria used to determine the trustworthiness of research: credibility, dependability, transferability, and conformability (Moon et al., 2016). A detailed description of how each criterion was satisfied follows:

**Credibility.** Three key strategies were followed to establish credibility. The first two of these strategies are member checking to seek the participant's feedback and debriefing of the data analysis process, also known as peer review.

For the first strategy, member checking, all participants were given the opportunity to clarify and elaborate on their responses to the interview questions to ensure that the interviewer captured the details of the graduates' perceptions. After transcribing the interviews, the PI invited each participant to review the transcript to verify accuracy of the data obtained from the interview. The feedback obtained from the participants, in addition to the analysis logbook, provided corroborating evidence in the data (Creswell & Poth, 2018).

The second strategy is peer review. As mentioned earlier, an expert reviewed the coding to ensure interreliability of the analysis outcomes (Creswell & Poth, 2018).

The third credibility strategy is clarifying researcher bias by engaging in reflexivity (Creswell & Poth, 2018). Given that the PI is an employee of OCHS, the PI was aware that the

past experience of working in OCHS could potentially introduce bias, which could have had an influence on the graduates' interviews and the data analysis (Creswell & Poth, 2018). Hence, another peer researcher, who is not involved in teaching at OCHS, conducted the interviews.

**Dependability.** Although dependability can be achieved by providing clear documentation of the research design, including the study setting, sample selection, data collections, and implementation of the study (Moon et al., 2016), according to a prior study by Pitney (2004), using the member-checking strategy is sufficient to establish dependability. For this study, a summary of the interviews with emerging codes was shared with the participants to authenticate their views (Pitney, 2004). Further, the PI maintained an audit trail, describing the coding and recoding process (Anney, 2014; Ivankova, 2013).

**Transferability.** The criterion of trustworthiness relates to verification that the findings are applicable to other, similar contexts. To satisfy transferability, the PI provided thick, rich descriptive information about the participants and the setting under study (Creswell & Poth, 2018; Pitney, 2004). Moreover, interviewing diverse participants from multiple campuses of OCHS suggests that the findings may be applicable to other nursing colleges in Oman (Pitney, 2004).

**Confirmability.** Anney (2014) suggested that creating an audit trail offers evidence that delineates the analysis process and the product. Through sufficient compliance with the aforementioned criteria of trustworthiness, this study offered the readers and the reviewers a transparent research procedure, which enables a rigorous evaluation of the study and is also relevant to demonstrate the quality of the entire study, as described in the following section (Moon et al., 2016).

## **Ethical Considerations**

Institutional review board approval was obtained from the University of Missouri, Columbia and the Directorate General of Research and Planning at the Ministry of Health in Oman. To ensure compliance with ethical guidelines and practices, a number of ethical considerations were followed in each phase.

### ***Quantitative Phase***

To ensure the confidentiality of the participants, the data were anonymized and assigned a new identification code. The PI saved the original data set in a separate password-protected computer. As the analysis of students' grades is a common educational practice, in this part of the study, the target population was not considered a vulnerable population, and no potential risk was associated with the study. In the second part of the quantitative phase, the survey-based data collection, the nurse educators, who coordinate the participants' internship programs, distributed the survey. The survey information sheet clearly stated that participating in the study was voluntary. Using the nurse educators to disseminate the surveys ensured that the PI had no access to subjects' email addresses or other contact information without their permission.

### ***Qualitative Phase***

For the second phase of the study, the qualitative phase, the participants were reminded of their right to withdraw from the study at any time. The interview data, including transcribed documents, were saved on a password-secured laptop, and only the PI had access to it. Moreover, all audio recordings will be destroyed after the study is completed. Throughout the transcription and the analysis process, privacy was maintained by using a code for each participant. The findings of the study will be disseminated with no identifiers of the participants' names or geographical locations (Richards & Morse, 2013, p. 264).

## **Potential Risks and Protection Against Risks**

Data used in the study were anonymized to ensure that individual participants cannot be identified. Neither the survey nor the interviews included any personal identification information. The data will not be shared or used for any other purpose beyond the study scope.

### ***Risk-Benefit Ratio: Potential Benefits of the Proposed Research to the Participants and Others***

The study findings will enable faculty and school leaders to identify students who are risk for failure at an early stage in the program and plan supportive learning measures accordingly. Moreover, the findings can support quality improvement plans to enhance the learning experience of future students.

## **Quality of Mixed Methods Study**

According to Plano Clark and Ivankova (2016), to secure the quality of a mixed methods study, the research should cover three overarching perspectives: the quality of the quantitative and the qualitative strands; the quality of the mixed methods design; and an assessment of inferences generated from the entire study.

### ***Quality of Quantitative and Qualitative Study Strands***

For this study, the PI articulated the procedures to ensure the quality of each strand of the mixed method individually. The quality of the quantitative strands is described in relation to the validity and reliability of the measures employed for the study. Additionally, limitations of the quantitative phase and potential measures to address the limitations were discussed. In regard to the qualitative strand, strategies of establishing trustworthiness of the data and analysis were delineated (Ivankova, 2013).

### ***Quality of Mixed Method Design***



The study procedures, including a follow-up sample selection for the qualitative phase, and the design of the semi-structured interview questions were all reviewed for alignment and suitability to answer the research questions. A statistician was consulted for analysis of the quantitative data. For the qualitative data analysis, the PI maintained reflective notes and a journal of the coding process as an audit trail. The coding was also reviewed by a qualitative research expert to ensure the quality of the analysis process (Plano Clark & Ivankova, 2016).

### ***Quality of Generated Inferences***

Plano Clark and Ivankova (2016) suggested two primary aspects to describe the quality of inferences: the inferences quality and inference transferability. The inferences quality refers to the consistency of the study outcomes with the theory guiding the study, prior research, and inferences with the findings from each strand. Throughout the study, the PI employed a systematic procedure to integrate the quantitative and the qualitative strands and use valid measures that contribute to the quality of inferences (Plano Clark & Ivankova, 2016). Further, the interaction between the findings from the quantitative and the qualitative strands were examined to determine the need for any additional analyses or re-examinations of the analyses. Additional analyses of the quantitative data were conducted to enrich the interpretation of the results (Ivankova, 2013). In regard to the inference transferability, as the participants were purposefully recruited from different OCHS campuses, the outcomes of this mixed method study can potentially be of relevance to other allied health programs within OCHS and other nursing colleges in Oman.

### **Mixed-Method Integration**

According to Creswell and Plano Clark (2018), various approaches can be taken to integrate quantitative and qualitative research procedures and data, which ultimately enhance the

value and quality of the mixed method. Some of the recommended approaches include integration at the study design, method and analysis, interpretation, and reporting levels. In this study, the integration was implemented at the design level by employing an explanatory, sequential, mixed-method design (Fetters, Curry, & Creswell, 2013). Integration was also employed at the method level, using the connecting approach by selecting the qualitative participants from the quantitative phase sample (Creswell & Plano Clark, 2018). At the data interpretation and reporting level, integration was implemented by following a staged approach whereby the quantitative data analysis and emerging findings would be reported first, followed by the qualitative data interpretation and reporting (Fetters et al., 2013). The purpose of this sequence is to use the quantitative strand to provide an overall picture of students' trajectory in the nursing program: variables that predict students' academic success and graduates' satisfaction with their educational environment. The qualitative strand aims to further explain, and deepen the understanding of, which factors affect student success. The overall rationale for mixing methods serves to enhance the explanation of why some students are successful and some are not.

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## **Chapter 4**

### **Results**

This chapter is comprised of two manuscripts presenting the results of this dissertation. The first manuscript focused on the first part of the quantitative phase, answering five research questions using a retrospective analysis of student academic records. The second manuscript incorporated the second part of the quantitative and the qualitative phases and addressed the sixth research question. The present chapter provides an overview of the study, key findings, discussion, recommendations, and implications for future studies.

## **Predictors of Nursing Student Success at the Oman College of Health and Sciences**

### **Abstract**

**Background:** Evidence suggests student failure and delay in progression are related to ineffective student selection criteria. Therefore, it is imperative for nursing schools to understand how students' academic and demographic characteristics interact to influence student success.

**Purpose and design:** This retrospective analysis aims to determine the relationship among student demographics, academic characteristics, and nursing student success at Oman College of Health & Sciences.

**Methods:** A total of 267 students' academic records from seven campuses were included in this study. Student academic records were analyzed using Pearson correlations, bivariate, and multiple regression analyses to identify predictors of student success, defined as GPA at the end of each year in nursing.

**Results:** The current admission criteria (i.e., high school English and science courses, student high school average score) was only marginally predictive of subsequent academic achievement in nursing, particularly the first 2 years of the program. Student score on English level-3 course and academic history during the program are among the consistent predictors of student success across all 4 years of the program. Gender and living arrangements were also a statistically significant predictor of student success.

**Conclusion:** Further studies are needed to better understand the factors that uniquely influence student success.

*Keywords:* Preadmission criteria, predictors of student success, non-academic characteristics, student success, baccalaureate nursing programs

# **Predictors of Nursing Student Success at the Oman College of Health and Sciences**

## **Background**

The demand for program effectiveness in nursing education is intensified by the need to produce a qualified nursing workforce to meet growing and complex healthcare needs. Overall, the advantages of enhancing nursing program outcomes, particularly regarding student success, extend beyond the nursing school and the students to also include healthcare settings and, ultimately, the community served by nursing graduates (Al-Alawi et al., 2020). Hence, many nursing schools follow stringent admission criteria for screening applicants who are best qualified for the rigor of the nursing program and more likely to succeed within the allotted timeline (O'Lynn, 2017). Despite extensive research about nursing student success and nursing admission policies, nursing schools continue to encounter challenges related to student progression and retention (Jeffreys, 2015; Lancia et al., 2018). For example, Lancia et al. (2018) noted that student academic failure ranged from 9% to 46.3% globally. Nursing student attrition rate is also a widespread problem. In the United States, about 50% of nursing students do not complete their program (Bennett et al., 2016). In the United Kingdom approximately 27% to 40% students leave nursing programs before graduation. In Canada the attrition rate among nursing students is roughly 28% (Mooring, 2016). Evidence suggests these alarming rates of nursing student attrition are related to ineffective student selection criteria (Newton & Moore 2009; Newton et al., 2007). Therefore, it is imperative to understand how students' academic and demographic characteristics interact to influence student success (Jeffreys, 2015).

## **Literature Review**

There is a wealth of literature on assessing the relationship between admission criteria and student success in nursing education programs. Studies consistently find that pre-nursing



academic performance, as measured by Grade point average(GPA), is a significant predictor of students' success, particularly the likelihood of graduating (Strickland & Cheshire, 2017; Tartavouille et al., 2018) and completing the nursing program on time (Herrera, 2013). A closer examination of student pre-nursing GPAs and potential academic success consistently revealed that the pre-admission science GPA is a significant predictor of students' nursing GPA—that is, students with higher prerequisite science GPAs tend to have higher GPAs in their nursing courses (Strickland & Cheshire, 2017; Wambuguh et al., 2016) and are more likely to be successful in passing the NCLEX-RN exam (Elkins, 2015; Hinderer et al., 2014; Mthimunye et al., 2018; Wambuguh et al., 2016). Many studies have shown that scores on standardized entrance exams were also associated with student's nursing GPA (Diaz et al., 2012; Wolkowitz & Kelley, 2010; Wambuguh et al., 2016), program completion (Tartavouille et al., 2018), and graduation (Wambuguh et al., 2016).

With respect to the relationship between students' high school academic performance and their future academic performance in the nursing program, available evidence showed a significant correlation between students' grades in high school and their subsequent academic achievement in their first and second academic years in the nursing program (Ali & Naylor, 2010; Lancia et al., 2013). Similar findings were echoed by Dante et al. (2013), who found that students with lower high school GPAs were more likely to fail in the first year of the nursing program. Some studies also noted that students' performance secondary school science courses predicted with student success in the nursing program (Ali & Naylor 2010; Lancia et. Al., 2013).

Studies that examined English language competency, as a predictor of student success, noted that student GPAs in English prerequisite courses were predictors of nursing student

academic achievement (Jeffreys, 2007) and graduation within the required timeframe (Pitt et al., 2012).

Prior research exploring potentially reliable and valid variables in predicting student success in nursing programs revealed that student past academic achievement (pre-nursing courses, prerequisite science courses, high school GPA, and English course grades) are among the core predictors of student success. Among this research, there are more studies on predicting success on the NCLEX-RN exam and fewer studies on student success within the nursing program (Al-Alawi et al., 2020; Gartrell et al., 2020). There were even fewer studies that examined the influence of demographic variables on student success. Moreover, much of the research on this topic comes from either American or European studies. The complexity of factors that contribute to student success and the variability of programs and student demographics make it challenging to form a prediction model for student success across various programs and countries. In fact, the existing evidence remains inconclusive about the perfect formula for student success. Hence, schools must explore the core predictors relevant to their school context and student population (Al-Alawi et al., 2020).

### **Context: The Oman College of Health Sciences**

The Oman College of Health Sciences (OCHS) has been the primary pipeline for nurses in Oman since 1983. Although the college offers other programs such as physiotherapy and pharmacist assistant, nursing is one of the college's largest programs. The college consists of nine satellite campuses in different regions of the country: (1) Muscat, (2) Sohar, (3) North Batina (NB), (4) Rustaq, (5) Nizwa, (6) Ibri, (7) Ibra, (8) Sur, and (9) Salalah.

With an annual admission ranging from approximately 400 to 450 students for the nursing program, high school applicants are required to attain a minimum of 65/100 in their

overall high school certificate in order to be granted admission to the nursing program at the OCHS. This criterion is relatively low compared to the nursing program at the flagship university, Sultan Qaboos University in which applicants are required to attain a minimum of 85/100 in their overall high school certificate. All accepted applicants at OCHS are required to take a nationally mandated one-year program known as the General Foundation Program (GFP) before progressing to their respective field's 4-year nursing program. The GFP is designed to prepare students by offering courses in intensive English, study skills, introductory math, and information technology to better prepare students for a college-level education and to enhance their proficiency in English (Al-Mamari, 2012; Islam & Al-Ghassani, 2015). It is worth noting that all students in these programs are native Arabic speakers, which makes the GFP an important phase for the incoming high school graduates not only to assess their English skills but also to ease the transition to college-level education. Thus, all incoming students sit for an English placement exam, and according to their performance in the exam, are assigned to either English Level 1 (Beginner), Level 2 (Intermediate), or Level-3 (Advanced). Regardless of what level a student is assigned, they must complete English Level-3 during the three semesters of the GFP. Students must pass all the required program courses to progress to their prospective field of study.

Once these requirements are completed, all students are enrolled in the nursing programs full-time and progress as cohorts. Student academic achievement is reported using a credit hour system and GPA (Directorate General Education of Training, 2012). Despite the obstacles of managing both academically challenged students and scarce academic resources, OCHS strives to meet the growing demand for more nurses in the health-care sector and to provide a quality education to an expanding student enrollment.

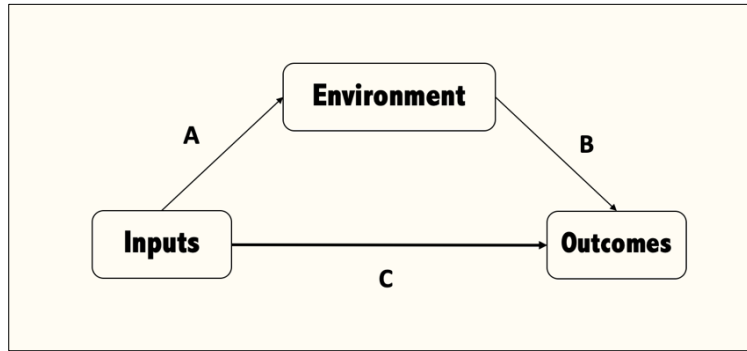
Reports from the latest audit of the college revealed several emerging concerns regarding the quality of the college graduates and their preparedness for working in the health care facilities. Some stakeholders believed that the low admission criteria resulted in the recruitment of unprepared students and pointed to the need to revisit the admission standards at the college (Oman Academic Accreditation Authority, 2013). Thus, the purpose of this study is to examine factors that predict nursing student success in the OCHS, focusing on two sets of predictors—pre-admission predictors and demographics information.

### **Theoretical Framework**

This study was guided by Astin’s Input-Environment-Output (I-E-O) model, which is commonly used for program evaluation in higher education (see **Figure 4.1**). The model describes the relationship among three fundamental constructs for program evaluation. The *input* refers to the students’ characteristics at the time of entry to the program. This construct includes demographic data (e.g., age, gender, and parents’ level of education), measures of college readiness (as indicated by admission test scores, or precollege GPA), student aspirations and expectations, and student behavioral patterns (e.g., time spent studying, social interaction with peers, and student interaction with faculty members) (Astin, 2012). The *environment* encompasses the factors involved in the students’ educational experience throughout the program. The *output* is defined as the outcomes, results, or consequences of the *input* and the *environment*. The pathways (A, B, and C) illustrate the relationship among the model concepts in which input is directly correlated with output and mediated by the environment (Astin, 2012).

#### **Figure 4.1**

*The Input-Environment-Outcome (I-E-O) Model*



Adapted from p. 20 of “Assessment for excellence: The philosophy and practice of assessment in evaluation in higher education,” by A.W. Astin, 2012, Rowman & Littlefield Publisher.

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This study will focus on the direct relationship between inputs (particularly students’ demographics and academic characteristics) and program outcomes.

### **Research Questions**

Five research questions were addressed in this study:

1. What are the student success rates as defined by student retention, attrition, and success rates for the nursing graduates of 2018?
2. What is the relationship between students’ high school English test scores and their subsequent GPA at the end of both the GFP and each academic year in the nursing program?
3. What is the relationship between the student demographics, the current admission criteria used by the OCHS, student on-time completion of the program, and cumulative GPA at the end of each year in the nursing program?
4. To what extent can a student’s achievements in the GFP be used to predict student GPA at the end of each academic year in the nursing program?

5. What are the best predictors of student academic achievement in the context of the OCHS?

## **Methods**

### **Design**

This study is a retrospective evaluation of student academic success assessing the association between student demographics, pre-admission variables, and student academic performance in the GFP and at the end each year in the nursing program.

### **Measures**

The descriptions and operational definitions of all the variables included in the study are illustrated in **Table 4.1**.

### ***Independent Variables***

To understand what student input factors predict student success, this study examined two primary sets of independent variables: the students' demographic profiles and their pre-admission data, per the admission policy of OCHS. The entry criteria consisted of scores attained in each of three high school courses—English, chemistry, and biology—and the student high school average score, which is a fundamental variable for admission in higher education. The student demographic profile included (a) gender, (b) student age upon admission, (c) marital status, (d) type of high school attended, (e) type of living arrangement during the study period, and (f) whether they are the first-generation to attend college (See Table 4.1).

### ***Dependent Variables***

The dependent variable for this study is student success, which is operationally defined by six variables: (a) student scores in the GFP English Level-3 course, (b) cumulative grade

point average (CGPA) at the end of each year in the nursing program, (c) success rate, (d) attrition rate, (e) retention rate, and (f) on-time completion of the program (see Table 1).

For this study, the definitions of student success, attrition, and retention were adopted from Jeffrey (2007).

- Student success is operationalized as the student who completed the nursing program within the legal timeframe (12 semesters, per the OCHS) by taking all the required courses sequentially with no history of failure or course retake (Jeffrey, 2007).
- Retention is achieved by students who progress sequentially, completing all the courses required to graduate but with an academic record of failure or retake of one course or more (Jeffrey, 2007).
- Attrition is defined as students leaving the program at any point in their trajectory because of academic failure or dismissal based on the academic policy (involuntary attrition) or because of personal reasons (voluntary attrition) (Jeffrey, 2007).

## **Sample**

The study followed nonprobability sampling using a convenience sample. The target population included all nursing graduates admitted to the OCHS in the 2013–2014 academic year.

## **Ethical Considerations**

Approval to conduct the study was obtained from the Institutional Review Board of the University of Missouri and the Ministry of Health in Oman. Permission was obtained from the OCHS to retrieve students' academic record data about the targeted cohort. To protect student record anonymity and privacy, each student was assigned a new identification number. The

master sheet was kept for evaluation purposes in a separate, password-protected laptop by the principal investigator (PI).

### **Data Collection**

Records from the nine nursing program satellite campuses were received and aggregated into one document. Student demographic data was obtained through a brief questionnaire collected along with a student satisfaction survey that was distributed in coordination with the Directorate General of Nursing Affairs at the Ministry of Health. Demographic data of the students who agreed to complete the survey matched with the available student academic records. All merged academic records and the matched data were reviewed for accuracy by both the PI and a hired educational administrative assistant from OCHS.

### **Statistical Analysis**

Data analysis was conducted using the statistical software SPSS 25.0. Descriptive summaries, including means and standard deviations, were used to describe the variables. A Pearson correlation, a bivariate regression, and multiple regression analyses were conducted to describe the relationships among student admission criteria, demographics, and student academic achievement. To account for the number of regressions conducted, a Bonferroni correction was used (Lomax & Hahs-Vaughn, 2012).

### **Missing Data**

A total of 375 student records were received from OCHS. Records included data for students who completed the program within the legal timeframe (one year in the GFP and four years in the nursing program) but not for students who repeated courses or failed to complete the program. Hence, the accuracy of calculating three of the study outcomes, retention, attrition, and graduation rates, was impacted by the missing data. Moreover, campuses had different

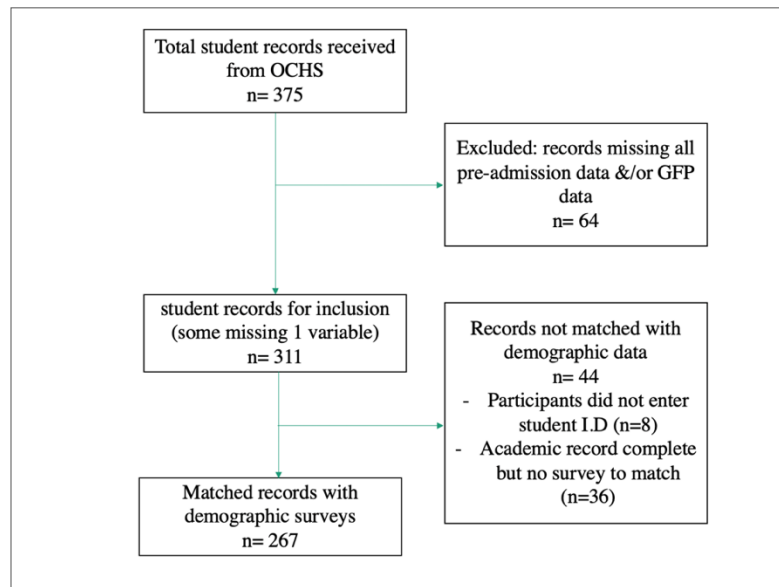


perspectives and approaches to student record management, particularly on saving student pre-nursing data, e.g., admission criteria and student GFP achievement. As a result, two campuses had incomplete student records (all pre-admission variables were missing records on student performance in the GFP). For this study, considering that pre-admission variables are core analytic variables, students from the two campuses (n=64) were excluded from the sample. The remaining five campuses each had some cases with missing data for a particular variable. For example, the Muscat campus had missing data on student performance on the GFP English courses, Salalah Campus had missing data on high school average grades, and other campuses had some missing English placement exam scores. In an attempt to gather a representative sample from various campuses without compromising the statistical analysis, any student record missing more than one variable was excluded from the study. Additionally, during the process of matching student academic record with the data collected from the demographic questionnaire, any student record that was not matched due to participants opting out of completing the survey was excluded from the data.

Given the aforementioned sample above restrictions (See Figure 4.2 *Figure 4.2* ) and the data management process, it is essential to note that the number of cases included for each regression model is outlined in the results.

**Figure 4.2**

*The Process of Sample Identification and Selection*



**Results**

The PI received data records of 375 students. Sixty-four records were missing all the student entry data and the English placement test scores and therefore, were omitted from the study. There were 267 student records matched with the demographic data from the questionnaire and were deemed eligible to be included in the analysis (Figure 4.2). The sample was predominantly female (n=266, 84.6%) and average age upon program entry was 18 years (M=18.76, SD=1.47). The majority of graduates (n=170, 63.7%) reported living home with family for the whole study period, while about third (n=83, 31.1%) lived in a dormitory, and 1 in 20 (n=14, 5.2%) had the experience of living at the dorms for two years and then living home with family for the remainder of the program. The data showed that 65.5% of the graduates identified themselves as the first-generation to attend college within their family, the vast majority (93.6%) were single, and 14.6% reported failing at least one course in the nursing program. Almost all the students had attended public school (n=266, 99.6%) therefore, this

variable was not included in the analysis. Table 4.1 illustrates other details of the participants' demographics.

**Table 4.1**

*Descriptive Statistics and Variables Definitions*

Variables	Definition/dummy variable	N (%)	Mean (SD)
<b>Independent variables</b>			
Gender	= 1 if female student = 0 if male student	226 (84.6) 41 (15.4)	
Age	Student age on admission	267	18.76 (1.47)
First-generation to attend college	Student whose parents do not have a college degree, = 1 if yes = 0 if no	175 (65.5) 92 (34.5)	
Marital status – Single	= 1 if married during the course of study = 0 if single	17 (2.8) 250 (6.4)	
History of failure	= 1 if the student failed in one or more courses during the study in the nursing program = 0 if the student has not failed any course	39 (14.6) 228 (85.4)	
Type of living arrangement	= 0 if lived at home during study, = 1 if lived in the dorms, and = 2 if lived both at home and the dorms	170 (63.7) 83 (31.1) 14 (5.2)	
Type of high school	=1 if public school, = 0 if private school	266 (99.6) 1 (.37)	
<b>Admission criteria</b>			
High school Eng. score	Grade attained in high school English course in the 12 <sup>th</sup> grade	247	73.0 (9.18)
High school biology score	Grade attained in biology course in the 12th grade of high school	247	83.6 (7.47)
High school chem. score	Grade attained in a chemistry course in the 12th grade of high school	247	79.53 (9.43)
High school average grade	= Mean high school grade	231	83.34 (4.28)
Eng. placement exam score	English placement exam score, which is administered on commencement of the General Foundation Program (GFP). Total possible score = 100	239	47.11 (12.49)
<b>Dependent variables</b>			
GFP Eng. Level-3	Score in advanced English course in GFP	152	75.78 (6.71)
Year-1 CGPA*	Student cumulative grade point average at the end of the second year of the nursing program.	267	2.85 (.57)
Year-2 CGPA*	Student cumulative grade point average at the end of the first year of the nursing program.	267	2.27 (.59)
Year-3 CGPA*	Student cumulative grade point average at the end of the third year of the nursing program.	267	2.89 (.49)
Year-4 CGPA*	Student cumulative grade point average at the end of the fourth year of the nursing program.	267	3.14 (.414)
Note: for continuous variables, means and standard deviations (SD) are reported; for dummy variables, the sample proportion is reported.			

Key: * GPA scale is 0–4: 0= F, 1= D, 1.5= D+, 1.74= C-, 2= C, 2.25= C+, 2.75= B-, 3=B, 3.25 = B+, 3.75= A-, 4= A
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Prior to the regression analysis, the data was examined for violation of assumptions. The statistical analyses showed that the assumptions of normality, linearity, and independence were all satisfied. The independent variables were also screened for multicollinearity. Evidence showed that the Tolerance was  $>.1$ , and the variance inflation factor (VIF) was  $< 10$ , suggesting that multicollinearity was not a concern. Results of the analyses are organized as follows based on the research questions:

### **1. Student success rate (student retention, attrition, and success rate)**

To calculate rate of success, we relied on self-report data from the demographic questionnaire in which students reported the history of failure in the program ( $n=41$ ), the retention rate was 15.4%, and the success rate was 84.6%.

We were not able to assess on-time program completion and student attrition rates because the datasets were limited to the students who completed the program within the required timeline—4 years. Additionally, records on students who repeated a course or courses were also missing, which are vital to calculating retention and success rates.

### **2. Student high school English scores and subsequent academic achievement**

Pearson correlations were calculated to determine the relationship between student high school English course scores and student success (i.e., student GPF English Level 3 score and their nursing GPA at the end of each year). Results show student high school English scores correlated with student scores in English Level-3, also student CGPA at the end of each year in nursing, was significantly correlated only with student CGPA at Year-1 of nursing ( $r(247) = .126, p < .05$ ). Students who obtained a higher grade in their high school English, had a higher CGPA at the end of the first year of the nursing program.

### 3. Current admission criteria, student demographics, and student nursing GPA

For the dependent variables of student CGPA at the end of each year of nursing, student performance on the English placement exam, which is an exam administered prior to starting the GFP, was added to pre-admission predictors as a pre-nursing predictor of academic success. The results outlined in Table 4.2 show that student success in the high school English course significantly predicted students' Year-1 CGPA ( $B=-.010$ ,  $p < .05$ ) and students' Year-2 CGPA ( $B=-.009$ ,  $p < .05$ ). English placement exam scores were a statistically significant predictor of student success in the first three years of the nursing program; however, that influence was not significant as students progressed to Years-3 and 4. Although weak predictors, both high school science courses, biology ( $B= .022$ ,  $p < .05$ ) and chemistry ( $B= .010$ ,  $p < .05$ ), were predictive of student success in the second year of nursing, indicating that students with higher scores in pre-entry science courses are more likely to have higher CGPA in their second year of nursing. Similarly, the students' high school average grades significantly predicted Year-1 CGPA ( $B=.060$ ,  $p < .001$ ) and Year-3 CGPA ( $B=-.032$ ,  $p < .05$ ).

**Table 4.2**

*Predicting Student Success with Pre-admission Criteria*

	Dependent variables			
	Year-1 CGPA (n= 227)	Year-2 CGPA (n= 227)	Year-3 CGPA (n= 227)	Year-4 CGPA (n= 227)
<b>Admission criteria</b>				
High school English score	-.010* (.004)	-.009* (.005)	-.007 (.004)	-.001 (.004)
High school Biology score	.009 (.008)	.022* (.009)	.009 (.008)	.011 (.007)
High school Chemistry score	.003 (.005)	.010* (.005)	.007 (.004)	.005 (.004)
High school average score	.060*** (.015)	.025 (.016)	.032* (.014)	.020 (.012)
<b>General foundation program</b>				
English placement exam	.012***	.014***	.009**	.004

Constant	(.003) -2.906	(.004) -2.468	(.003) -.924	(.003) -.003
R square	(.633) .401	(.679) .357	(.586) .288	(.514) .223
Adjusted R square	.388	.342	.272	.206
F statistic	29.603***	24.502***	17.872***	12.716***
The unstandardized coefficients are reported. Estimated error is reported in the parentheses, Significance level are reported as follows: * $p < .05$ , ** $p < .01$ , *** $p < .001$ .				

Regarding the relationships among students' demographic profiles, the history of failure in the program, and student success (Table 4.3), all variables were dummy coded, and a reference group was created for each variable. The multiple regression model illustrated in Table 5 highlights two variables as strong, significant predictors to student success for all four years of study in nursing, (1) gender, i.e. being a female student, and (2) a history of failure during the program. Gender appeared to have a strong predictive contribution to a student's CGPA. Female students were likely to surpass male students in CGPA by almost a full point (0.7) in Year-1, by half a point (0.5) in Year-2 and Year-3; and by (0.3) points in Year-4.

The second significant predictor in this model is student history of failure. Students who reported no history of failing a course during the program were likely to exceed the CGPA of their counterparts by half a point (0.5) or more at the end of each year of their study. Living at home was also a statistically significant predictor for Year-1 CGPA ( $B=.164, p<.05$ ), Year-2 CGPA ( $B=.187, p<.01$ ), and Year-4 CGPA ( $B=.206, p<.001$ ) but not for Year-3 CGPA. Age is another predictor that showed predictive value to student academic achievement in Year-3 ( $B= -.04, p<.05$ ). The negative coefficient indicates that older students are likely to attain lower CGPA in Year-3.

**Table 4.3***Predicting Student Success with Demographic Variables*

	Dependent variables			
	Year-1 CGPA (n=267)	Year-2 CGPA (n= 267)	Year-3 CGPA (n= 267)	Year-4 CGPA (n= 267)
Age	-.030 (.021)	-.024 (.023)	-.040* (.019)	.005 (.016)
Gender – Female	.677*** (.082)	.452*** (.091)	.478*** (.076)	.278*** (.062)
First generation. to attend college	-.021 (.062)	-.058 (.068)	.058 (.057)	-.024 (.047)
Lived home & dorms	.116 (.139)	.105 (.153)	.062 (.128)	.127 (.105)
Lived home	.164* (.064)	.187** (.071)	.078 (.059)	.206*** (.092)
Marital status – Single	.154 (.121)	-.023 (.134)	-.004 (.112)	.064 (.092)
History of failure – No	.564*** (.083)	.609*** (.092)	.465*** (.077)	.436*** (.063)
Constant	2.114*** (.428)	1.756*** (.472)	2.747*** (.395)	2.262*** (.323)
R square	.338	.248	.253	.271
Adjusted R square	.320	.227	.233	.252
F statistic	18.884***	12.179***	12.551***	13.779***

The unstandardized coefficients are reported. Estimated error is reported in the parentheses, Significance level are reported as follows: \*  $p < .05$ , \*\*  $p < .01$ , \*\*\* $p < .001$ .

#### 4. English Level-3 performance and student nursing GPA

As shown in Table 4.4, English Level-3 score was a consistent predictor of student CGPA at the end of each year of the nursing program: Year-1 CGPA ( $B=.048, p<.001$ ), Year-2 CGPA ( $B=.043, p<.001$ ), Year-3 CGPA ( $B=.033, p<.001$ ), and Year-4 CGPA ( $B=.024, p<.001$ ). This finding suggests that students who attain higher scores in the English Level-3 course are more likely to have higher academic achievement in nursing programs. The English Level-3 score accounted for more than 25% of the variation in Student CGPA in the first two years of their studies.

**Table 4.4***Predicting Student Success with GPA of English Level-3 Score*

	Dependent variables			
	Year-1 CGPA (n= 152)	Year-2 CGPA (n= 152)	Year-3 CGPA (n= 152)	Year-4 CGPA (n= 152)
<b>General foundation program</b>				
English Level-3 score	.048*** (.006)	.043*** (.006)	.033*** (.006)	.024*** (.004)
Constant	-.625 (.428)	-.731 (.447)	.484 (.436)	1.538 (.288)
R square	.327	.267	.184	.211
Adjusted R square	.323	.262	.179	.206
F statistic	72.980***	54.728***	33.829***	40.161***
The unstandardized coefficients are reported. Estimated error is reported in the parentheses. Significance level are reported as follows: * $p < .05$ , ** $p < .01$ , *** $p < .001$				

**5. Best predictors of student academic achievement**

To identify which variables best predicts student success in the nursing program, all the significant pre-nursing academic variables (i.e., admission criteria, English placement exam score, and student score in GFP English Level-3) and the significant demographic variables were entered in a single regression model (Table 4.5). Student history of failure and student performance in the English Level 3 course remained stable in their predictive contribution to student success across all four study years; however, gender (i.e., being a female student) was somewhat stable, as it predicted Year-1, Year-3, and Year-4 CPGA but not Year-2 CGPA. The other variables were not uniquely beneficial in predicting student success in nursing with exception of high school chemistry course scores, which were predictive of Year-3 CGPA ( $B=.023, p<.05$ ).

**Table 4.5***Predicting Student with Academic and Non-academic Variables*

	Dependent variables			
	Year-1 CGPA	Year-2 CGPA	Year-3 CGPA	Year-4 CGPA



	(n=117)	(n= 117)	(n= 117)	(n= 117)
<b>Demographics</b>				
Gender – Female	.341*	.146	.352*	.276*
	(.158)	(.152)	(.149)	(.115)
Lived home	.004	.004	.070	.110
	(.083)	(.08)	(.079)	(.061)
History of failure – No	.505**	.429**	.408*	.323**
	(.165)	(.159)	(.155)	(.120)
<b>Pre-nursing variable</b>				
High school English score	-.004	-.008	-.001	.001
	(.007)	(.006)	(.006)	(.005)
High school Biology score	.013	.021	.016	.014
	(.012)	(.012)	(.011)	(.009)
High school Chemistry score	.005	.009	.023*	.008
	(.010)	(.010)	(.009)	(.007)
High school average score	.018	-.001	-.037	-.018
	(.025)	(.024)	(.024)	(.018)
English placement exam	.001	.003	-.004	-.004
	(.004)	(.004)	(.004)	(.003)
English Level-3	.023**	.028***	.028***	.014*
	(.008)	(.008)	(.008)	(.006)
Constant	-2.332*	-2.063	.376	1.437
	(1.153)	(1.112)	(1.087)	(.841)
R square	.548	.524	.463	.372
Adjusted R square	.510	.484	.418	.319
F statistic	14.420***	13.087***	10.253***	7.032***
The unstandardized coefficients are reported. Estimated error is reported in the parentheses, Significance level are reported as follows: * $p < .05$ , ** $p < .01$ , *** $p < .001$				

### Additional Analysis

Considering that including the GFP English Level-3 scores excludes a large segment of the sample (n=117) due to missing data for this variable (from the Muscat campus), the authors sought to examine any changes in the predictive ability of the variables when including data from Muscat campus. Hence, additional analysis was conducted by including all the significant variables but excluding the GFP English Level-3 scores. Table 4.6 outlines three primary findings that emerged due to the removal of the GFP English Level-3 score from the model. First, demographic variables (gender, living arrangements) were no longer predictive of student

success in the nursing program with exception of Year-4 CGPA, for which living arrangement (i.e., living home) was a statistically significant predictor to student CPGA ( $B=.105, p <.05$ ). Second, student scores on the English placement exam predicted student success in the first three years of the nursing program. Third, although weak and inconsistent in exerting influence over time, some admission variables appeared statistically significant in predicting the trajectory of student success. For example, student high school English scores ( $B= -.009, p <.05$ ) and high school average grades ( $B= .04, p<.05$ ) were only predictive of Year-1 CGPA. The high school biology score was predictive of Year-2 CGPA ( $B=.026, p <.01$ ) and year-4 CGPA( $B=.014, p <.05$ ), and the chemistry score was a statistically significant predictor of Year-2 CGPA ( $B=.012, p<.05$ ) and Year-3 CGPA ( $B=.009, p<.05$ ). High school average was only a significant predictor for year-1 CGPA ( $B=.041, p<.05$ ).

**Table 4.6**

*Predicting Student Success Excluding English Level-3*

	Dependent variables			
	Year-1 CGPA (n=227)	Year-2 CGPA (n= 227)	Year-3 CGPA (n= 227)	Year-4 CGPA (n= 227)
<b>Demographics</b>				
Gender – Female	.110 (.116)	-.178 (.121)	.154 (.107)	-.050 (.092)
Living arrangement – home	.046 (.059)	.083 (.061)	.025 (.054)	.105* (.047)
History of failure –NO	.438*** (.081)	.522*** (.084)	.414*** (.075)	.385*** (.064)
<b>Pre-nursing variable</b>				
High school English score	-.009* (.004)	-.007 (.004)	-.007 (.004)	-.001 (.003)
High school biology score	.013 (.008)	.026** (.008)	.013 (.007)	.014* (.006)
High school chemistry score	.004 (.004)	.012* (.005)	.009* (.004)	.005 (.003)
Higher school average score	.041* (.016)	.022 (.017)	.010 (.015)	.014 (.013)
English placement exam	.011**	.012***	.007**	.002

Constant	(.003) -2.296**	(.003) -3.084***	(.003) -.114	(.002) -.158
R square	(.774) .474	(.808) .465	(.714) .380	(.614) .351
Adjusted R square	.455	.446	.357	.327
F statistic	24.571***	23.707***	16.669***	14.709***
The unstandardized coefficients are reported. The estimated error is reported in parentheses. Significance level is reported as follows: * $p < .05$ , ** $p < .01$ , *** $p < .001$				

The results above imply that predictors of student success might differ across campuses. To better understand how student campus affiliation influenced student success, Rustaq campus was set as a reference group and bivariate linear regression analyses examining campus affiliation as independent variable was conducted. As expected, campus affiliation was a strong predictor of student success. Notably, the results illustrated in Table 4.7 suggested that students from the Muscat and Sohar campuses are the most impacted by their campus affiliation. For example, in reference to student success at the Rustaq campus, students from Muscat campus are likely to underperform them by half a point (0.50) in Year-1 CGPA, almost a full point (0.93) in Year-2 CGPA, half a point (0.46) in Year-3 CGPA, and again, half a point (0.50) in Year-4 CGPA. Upon closer examination of students' trajectories across all campuses, a sharp decline was noted in Year-2 CGPA, while a prominent jump was noted in Year-4 of the program. The most noticeable drop in Year-2 CGPA is seen at Muscat campus while, highest increment is Year-4 CGPA was in Salalah campus (Figure 4.3). Table Table 4.8 shows further examination of student population per campus based on entry criteria and demographics (See Table 4.8). Notably, characteristics of the student population vary substantially across the seven campuses.

**Table 4.7**

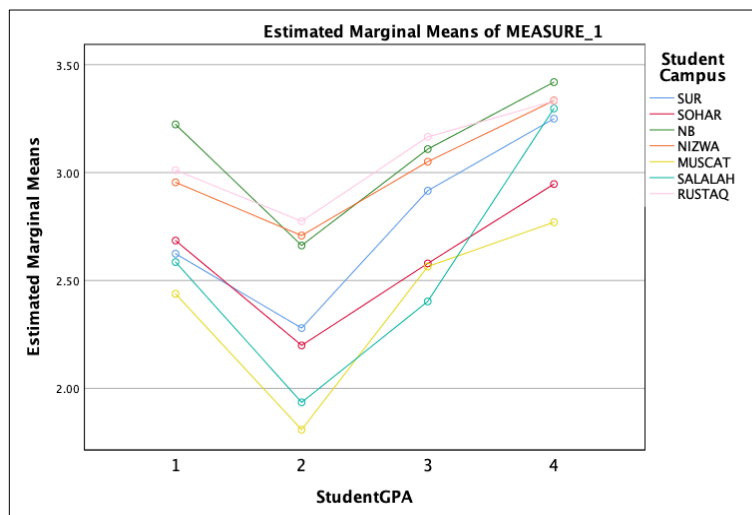
*Predicting Student Success by Campus Affiliation*

	Dependent variables			
	Year-1 CGPA (n=267)	Year-2 CGPA (n= 267)	Year-3 CGPA (n=267)	Year-4 CGPA (n=267)
Sur campus	-.288* (.143)	-.325** (.124)	-.071 (.120)	.058 (.083)
Sohar campus	-.349* (.158)	-.600*** (.137)	-.609*** (.133)	-.369*** (.092)
NB campus	.192 (.150)	.018 (.130)	.047 (.126)	.174* (.088)
Nizwa campus	-.084 (.154)	-.086 (.134)	-.102 (.130)	.002 (.090)
Muscat campus	-.504*** (.121)	-.930*** (.105)	-.469*** (.102)	-.504*** (.070)
Salalah campus	-.126 (.158)	-.597*** (.137)	-.556*** (.133)	.071 (.092)
Constant	3.132*** (.110)	2.819*** (.096)	3.203*** (.093)	3.358*** (.064)
R square	.172	.418	.224	.456
Adjusted R square	.153	.405	.206	.443
F statistic	9.021***	31.168***	12.502***	36.307***

The unstandardized coefficients are reported. Estimated error is reported in the parentheses, Significance level are reported as follow: \*  $p < .05$ , \*\*  $p < .01$ , \*\*\* $p < .001$

**Figure 4.3**

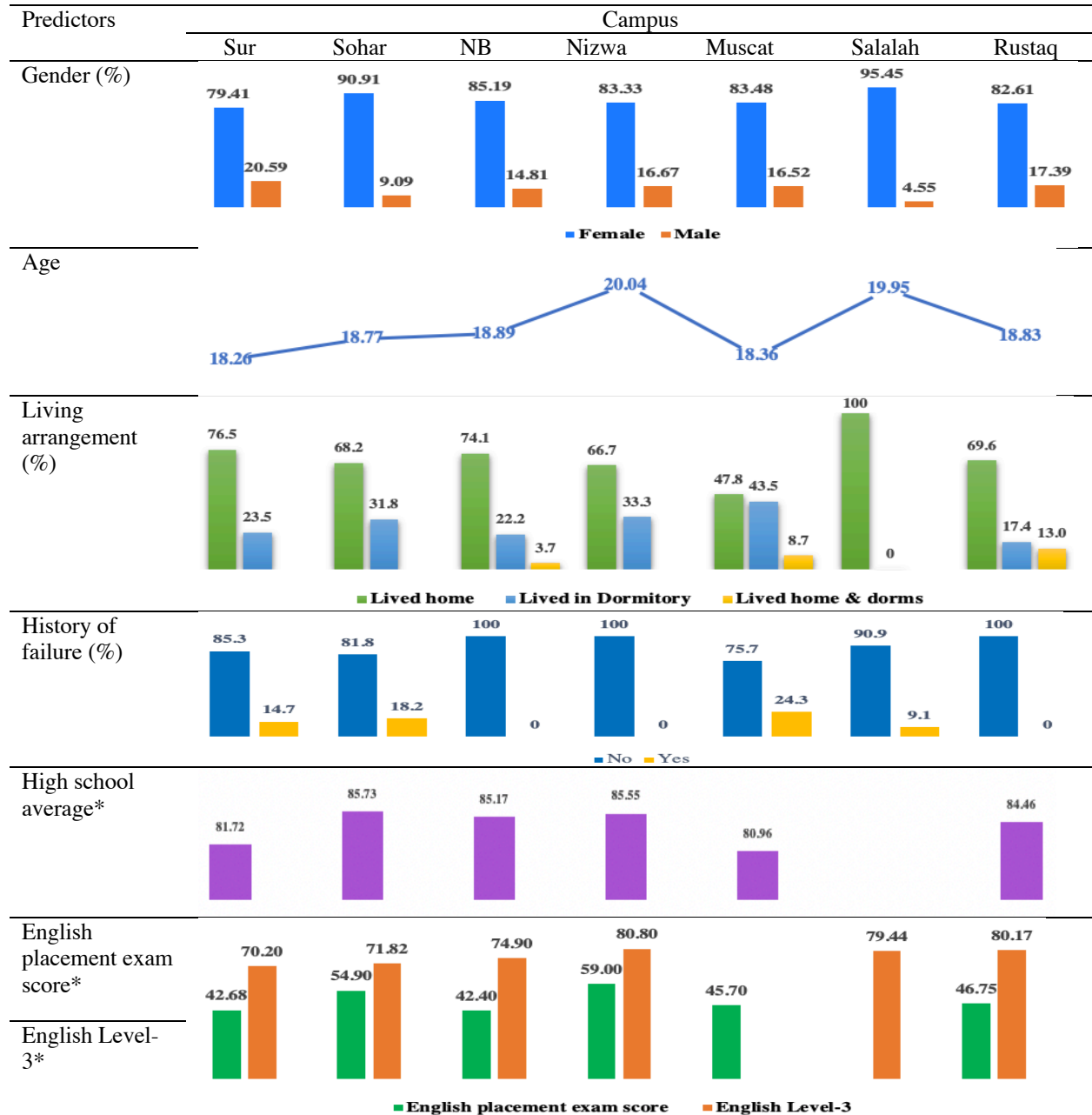
*Student Trajectory Across All Campuses*



Note: 1= Year-1 CGPA, 2= Year-2 CGPA, 3= Year-3 CGPA, 4 = Year-4 CGPA

**Table 4.8**

*Characteristics of Student Population per Campus*



Note. \*Missing data for Muscat and Salalah campuses.  
For continuous variables, means are reported; for dummy variables, the sample percentages is reported.

## **Discussion**

Drawing on Astin's Input-Environment-Outcome model from 2012, a retrospective analysis was conducted to evaluate the relationship between student inputs (i.e., student demographics and pre-admission variables) and program outcomes—particularly student academic success. For this study, student success was defined by (a) the attrition rate, (b) the retention rate, (c) the graduation rate, (d) the student GPA in GFP English Level-3 course and, (e) the student CGPA at the end of each year in the nursing program.

### **Academic Independent Variables**

When examining the predictive contribution of the admission criteria to student success in the nursing program at OCHS, findings show that students who had higher grades in high school biology and chemistry courses attained a higher CGPA at the end of the second year of the nursing program (Table 4.2). Similar findings were reported by Ali and Naylor (2010) who attested that high school science grades, mainly grades in biology and chemistry, significantly predicted early student success in the nursing program (Ali & Naylor, 2010). With a relatively weak predictive value, high school average grades significantly predicted student success in Year-1 and Year-3 of the student trajectory. However, when assessed jointly with other demographic variables, high school average grades were deemed ineffective in predicting nursing students' academic achievement in the nursing program. This particular finding cannot be overlooked and requires revisiting and adapting admission criteria, as high school average grade is used as key determinant of access to higher education in Oman.

Consistent with existing evidence that student academic achievement (GPA) in English prerequisite courses increased the probability of student success (Jeffreys, 2007; Pitt et al., 2012), this study also found that students who attained higher scores in the GFP English Level-3

had a higher CGPA at the end of each academic year in their nursing study. Moreover, in a recent study at OCHS, Alghenaimi et al. (2018) noted that students who completed the GFP obtained a higher cumulative GPA in the nursing program. Unlike the predictive value of student achievement in GFP English course to student success, the results of this study found that high school English scores were only marginally helpful predicting of student success. In fact, the findings suggested that students with higher grades in high school English course were more likely to have lower CGPA in the first two years of nursing. This finding did not agree with previous research from Gilmore's (2008) who found that students' English ACT subscore was a statistically significant predictor of academic achievement in the nursing program.

Regarding the history of failure during the nursing program, this study confirms that students who experienced failure in one or more courses are less likely to experience a successful academic trajectory. Mthimunye et al. (2018) reported that students with higher academic achievement in their first-year of nursing school were likely to have higher success in Year-2, as would be expected.

### **Demographic Variables**

Prior studies have noted that the non-academic characteristics of students can influence student success and help identify students at risk of struggling academically in their learning experience (Beatie et al., 2018). This study found that students who live at home during their studies are likely to outperform students who live in dorms in their academic progression except in third year of their studies. Similar findings were reported by Wray et al. (2012) who noted that the students who experience change in residence arrangement for the purpose of attending school are less likely to progress in their studies when compared to students who remain in their permanent residence. This may be because students who live in the dorms have to cope with

living away from family while also navigating college life. (Wray et al., 2012). That being said, living at home showed no contribution to student success when examined with other student academic characteristics.

In this study, in addition to the history of failure in the program, the variable “gender–female” showed a uniquely significant effect on to student success over and above any of the pre-admission variables and the student performance in GFP. Many studies have reported that gender–female was associated with student success in nursing (Ali & Naylor 2010; Dante et al., 2013; Lancia et al., 2013; Lancia et al., 2018). However, it is unclear why the gender showed no predictive value when removing the GPA of the GFP English Level-3 from the regression model (e.g., including students from Muscat campus who were missing the variable GFP English score). One potential explanation is that the student population on the Muscat campus is different from the ones on other satellite campuses. This notion was confirmed by examining the predictive contribution of campus affiliation to student success. The results in Table 4.7 and Figure 4.3 showed that along with the Sohar campus, students from the Muscat campus consistently underperformed when compared to students at other six campuses. Furthermore, it is unclear why students across all campuses experienced a sharp drop in their second-year CGPA. Although it may suggest that students experience academic difficulties in the second year of the program, further investigation can rule out any program-related challenges. Likewise, with regard to the increase in students’ fourth-year GPAs, even if one attributed the prominent increase in student GPAs in year four to student academic maturation and improvement in language competency, this explanation falls short of clarifying the unsteady student trajectory followed by a sudden jump in the final year’s CGPA.



The above findings suggest the importance of examining student characteristics (predictors of success) at individual campuses to clarify the variations in student performance. In the Input-Environment-Output Model, Astin (2012) emphasizes the interdependence of the key component of the model. Hence, OCHS can benefit from evaluating student academic outcomes in relation to the students' input and the context at a given campus (e.g., campus educational environment).

### **Student Attrition and Retention Rates**

Though attrition and retention rates are considered critical measures of program effectiveness, these variables were among the missing data. Thus, it was challenging to produce an accurate calculation of these outcomes thereby making it difficult to fully understand the phenomenon of student success, which is necessary for a comprehensive student support system. French et al. (2014) indicated that collecting student achievement data and analyzing it are critical to evidence-based program improvements, (e.g., enhancing program design, curricula, and teaching pedagogy) in order to facilitate a successful learning experience for students. It is a critical component for 'closing the loop' to allow faculty to reflect on student achievement data and provide targeted academic support for student success (French et al., 2014; Gartrell et al., 2020). Therefore, from an evaluation and quality improvement perspective, mere data collection is insufficient. It is imperative that the data are accessible and reliable to gain actionable insights.

This study contribute to our understanding of how various improvements could made to the OCHS nursing program. First, tracking student persistence, progress, and program completion offers empirical evidence that can guide the development admission criteria to select students that are best suited for the rigor of the nursing program. Second, tracking such data will generate a better understanding of when student progression issues occur and indicate which

factors in the program enable or hinder this progression. Third, the findings will help identify students who are at risk of failure in the early stages of the program in order to provide supportive measures to facilitate their success.

### **Limitations**

This study is not without limitations. Despite using data from seven campuses, the study was confined to one college. Thus, the findings may be unique to the studied student population and may not be generalizable to other institutions. Additionally, the measure used for most of the analyses relied on students' grades obtained in high school and student GPA as an outcome of the nursing program. Though the grading scheme for the 12<sup>th</sup> grade of high school is standardized nationally, and the nursing GPA scheme is consistent across all campuses, such measures do not eliminate the possibility of grade inflation. Hence, solely relying on grades and GPA as measures requires cautious interpretation of data (Al-Alawi et al., 2020).

### **Conclusion**

Student success is a core indicator of program effectiveness in nursing education. Moreover, student failure or delay in progression is a costly challenge. It burdens the already limited educational resources, financially taxes both the students and the educational institution, and hampers the effort to effectively respond to the growing demand for more nurses in health care settings. Thus, identifying students who are risk for failure at early stage of the nursing program is a vital research topic.

This study provided insights on (a) the association between pre-admission data and student success in nursing, (b) the impact of student performance in the GFP on subsequent academic achievement, and c) how a students' non-academic characteristics can influence their academic trajectory. The findings presented are essential not only for informing current

admission criteria at OCHS but also to understand better how other personal characteristics influence student success. Therefore, the emerging evidence urges nursing program administration to use student data, pre-admission characteristics, and demographic information to understand the various student factors that uniquely influence student success at their particular institution. Such data can help weed out students who are academically not ready for the rigor of the nursing program. It can also identify students who are at risk of failure and generate post-admission targeted support services that are inclusive to academically diverse student populations.

### **Implications**

With the limited evidence on nursing student success in Oman, much remains to be learned. To better understand the uniqueness of student populations across campuses, future studies should consider using a complete dataset and examining student success on individual campuses. Moreover, further research should focus on exploring if student success is best predicted by collegiate science courses offered in the first year of the nursing program such as anatomy and physiology, and biochemistry. Finally, consistent with Astin's I-E-O model, there are many more factors in the educational environment that interact with student academic and nonacademic factors and in turn, contribute to student success. Therefore, studies that include all the three elements of this model can offer a more comprehensive understanding of the student learning experience, personal and institutional predictors of success.

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## **Factors influencing nursing student academic success: A mixed methods study**

### **Abstract**

Various factors influence student success in nursing programs. To improve academic success, it is important to understand how student characteristics and the educational environment influence student outcomes. The aim of this sequential explanatory mixed-methods study is to examine the perceptions of nursing graduates about factors that influence student success. A survey was administered to 372 graduates from the Oman College of Health Sciences to assess their satisfaction with the quality of their educational environment. Eleven one-on-one interviews were conducted to elicit graduates' opinions of what factors affected their success in the nursing program. In total, 339 (91.1%) graduates completed the survey. Graduates were somewhat satisfied with the quality of their educational environments and were least satisfied with faculty in-class teaching. Analysis revealed a positive correlation between graduates' mean satisfaction and their graduating grade point average. Findings from the qualitative strand resulted in 4 themes perceived by graduates to have influenced their academic success: (a) positive prenursing academic experience; (b) student motivation, and support systems as a positive influence on academic engagement (c) language difficulties throughout the nursing program; and (d) challenging program design and delivery. In conclusion, understanding what is working in a program for whom and under what circumstances is key to improving nursing programs.

*Keywords:* nursing students, academic success, educational quality, student satisfaction

# **Factors Influencing Nursing Student Academic Success: A Mixed-Methods Study**

## **Background**

Educational programs are complex systems comprised of multifaceted, interdependent factors such as student academic and personal characteristics, the program curriculum, faculty-student interactions, and the educational climate—all of which can influence student outcomes (Farmawy & Saad, 2016). Education program evaluation is viewed as a means of informing faculty members and educational leaders about influential factors in program outcomes and student success (Astin, 2012). Available evidence shows that the quality of the educational environment affects students' academic attainment, satisfaction, and perception of their learning trajectory (Ramsbotham et al., 2019). Nursing schools have long invested in academic support programming, nonetheless, student failure and attrition has been one of the pressing challenges facing both students and nursing schools (Al-Alawi et al., 2020, Chan et al., 2019). Taking into consideration the fact that alumni have experienced all program components, their perspective on factors that acted as facilitators or barriers to success is invaluable in addressing student needs and risk factors for failure and guiding quality improvement in the program.

## **Literature Review**

Student success is a core value in higher education. In fact, student outcomes are identified as one of the prominent pressures facing higher education institutions (Graham & Donaldson, 2019). Students' learning experience and academic success are influenced by multiple student-related factors (inputs) such as student academic characteristics demographics, socioeconomic status (Ali et al., 2013; Astin, 2012; Jeffreys, 2015; Strickland & Cheshire, 2017; Wambuguh et al., 2016) and personal factors such as student motivation and study habits (Cosper & Callan, 2018). Studies on student academic characteristics found that student

prenursing achievement predicts students' success (Ali & Naylor 2010; Lancia et al., 2013; Strickland & Cheshire, 2017; Wambuguh et al., 2016).

Contextual factors, including the curriculum, faculty members, clinical preceptors, quality of assessment, clinical placement quality, and students' ability to assimilate classroom knowledge into a clinical setting, also affect student outcomes (Ali et al., 2013; Malwela et al., 2015). In Cosper and Callan (2018), both students and faculty members stated that curriculum organization, instructional strategies, and faculty support are important in students' success. Dube and Mlotshwa (2018) noted that students perceived supportive student-staff relationships, technological support, and adequate learning resources are enablers of academic success.

In contrast, inadequate learning facilities, including a lack of study spaces in the library, poor Internet connection, a lack of access to required books, and insufficient technical support, are some of the environmental factors found to be hindrances to student success (Dimkpa & Inegbu 2013; Pinehas et al., 2017). Alshammari et al. (2018) reported that poor student-staff communication, ineffective teaching strategies, and curriculum inadequacies are among the common barriers to students' success and satisfaction.

Current program evaluation studies of students' success in nursing education are either heavily quantitative, using tools to gauge program quality and students' satisfaction with their learning experience (Al-Alawi & Alexander, 2019), or are solely qualitative. Evidence from the literature suggests that traditional methods of evaluation using quantitative methods offer limited insight into programs; the information obtained is insufficient to offer answers about "what works, for whom, and in what circumstances" (Stavropoulou & Stroubouki, 2014, p. 201). Although the qualitative method is essential to convey the nuances of program participants' lived experiences, the method is limited in the ability to generalize the findings. Hence, the use of a

mixed-methods approach in this study will expand and strengthen the findings by promoting a deeper understanding of the educational environment, potential enablers, and barriers to student success (Al-Alawi & Alexander, 2019; Plano Clark & Ivankova, 2016).

## **Objectives**

The aim of this explanatory mixed methods study is to examine factors that Oman College of Health Sciences (OCHS) nursing graduates perceive as contributors or hindrances to student success. This study provides faculty members and college leaders relevant information to implement corrective program measures and enhance students' learning experience.

## **Methods**

### **Research Design**

This study is a sequential explanatory mixed-methods (quan → QUAL) study that examines the factors that affect student success in OCHS in three stages: (1) Using a cross-sectional approach to assess nursing graduates' satisfaction with the quality of their educational environment using the Undergraduate Nursing Student Academic Satisfaction Scale (UNSASS), (2) examining the association between alumni satisfaction and their academic achievement using statistical analysis, and (3) explaining and expanding on quantitative data by giving graduates a voice to share their lived experience on what factors have enabled or hindered their success (Creswell & Plano Clark, 2018).

### ***Study Setting***

The institution in question, OCHS, consists of nine satellite campuses offering a 4-year nursing program to full-time students. All nursing campuses run the same nursing curriculum and use a centralized assessment process. Students enrolled in college progress as a cohort through the program. Prior to beginning a nursing program, all accepted applicants must

complete a one-year precollege program, known as the General Foundation Program (GFP). GFP aims to prepare students for college-level education and for using English as a medium of instruction by offering intensive courses in English reading, writing, and listening skills (Al-Mamari, 2012; Islam & Al-Ghassani, 2015). OCHS underwent an institutional audit that identified multiple program components requiring improvement, including teaching resources, academic advising, information and learning technology services and other general support services such as student accommodation, and campus physical resources (Oman Academic Accreditation Authority [OAAA], 2013). Keeping this context in mind, numerous factors come into play when trying to understand student outcomes.

### ***Theoretical Framework***

The study is guided by Astin's (2012) model, Input-Environment-Outcome, for assessing the effectiveness of educational programs. Inputs refer to student academic characteristics, demographics, and personal factors. Environments include all educational activities and interventions that comprise the student learning experience, such as the curriculum, teaching approaches, educational policies, learning resources, and student–faculty and peer interactions. Outcomes are the consequences of both student inputs and educational experiences; it includes academic achievement, career development, student satisfaction, psychological well-being, and student cognitive and emotional development (Astin, 2012).

### ***Sample***

For the quantitative phase, nonprobability sampling was conducted using a convenience sample. The study targeted the first baccalaureate nursing cohort at OCHS, which started in the academic year 2013–2014. Only students who graduated within the required time frame in summer 2018 (n = 372) were included in the study. For the qualitative phase of the study, a

purposive sample (n = 11) was using maximal variation strategy. Following this sampling strategy, participants were chosen based on their gender, living arrangement during college, entry criteria (i.e., high school mean score), grade point average (GPA) upon graduation, and history of failing during the nursing program. This form of sampling allows adequate representation of graduates (Creswell & Plano Clark, 2018) and substantiates the collected data (Yin, 2016, p. 83). The sample size (n = 11) was determined by assessing data saturation following interview responses obtained from research questions (Creswell & Poth, 2018; Palinkas et al., 2015).

### ***Measures***

During the quantitative phase, the UNSASS was used to measure nursing graduate satisfaction with the quality of the graduates' educational environment. This survey consisted of 48 closed-ended statements divided into four subscales: (a) faculty in-class teaching (16 items), (b) clinical teaching (15 items), (c) program design and delivery (12 items), and (d) student support services (5 items). All the items were rated on a 5-point rating scale (1 = strongly disagree, 2 = disagree, 3 = somewhat, 4 = agree, 5 = strongly agree). The survey was designed and evaluated by Dennison and El-Masri (2012; see Table 1.3, Appendix C, for detailed UNSASS). The survey's psychometric properties showed a content validity index of .83, and a reliability of .88 (Dennison & El-Masri, 2012; Freeman et al., 2017; Su, 2013) and an overall Cronbach's alpha of .96, indicating that the UNSASS had excellent internal consistency and was a reliable measure of students' satisfaction with their educational environment (Dennison & El-Masri, 2012; Freeman et al., 2017). The UNSASS has been utilized to assess students' satisfaction during a nursing program (e.g., Freeman et al., 2017; Omer, 2016; Su, 2013) and after completing the program (e.g., Taylor, 2012). Along with the survey, brief demographic

information was collected, including (a) graduate's gender, (b) OCHS campus, (c) year of admission, (d) graduating year, (e) graduating GPA, and (f) indication of course failure during the program (history of failure: yes/no). During the qualitative phase, one-on-one interviews were conducted using semi-structured questions. The questions focused on what personal or program related factors acted as facilitators or hinderers to student success in pre-college education, GFP, and the nursing program. The participants were also asked what program changes or improvement could enhance the learning experience of students.

## **Data Collection**

### ***Quantitative Phase***

The UNSASS was distributed to participants with the assistance of the Directorate General of Nursing Affairs (DGNA) at the Ministry of Health. A nurse educator was assigned from each clinical site as the point of contact to coordinate with the principal investigator (PI) and assist in disseminating the survey. The participants were in their final weeks of a six-month national internship program, which made it easy to gain access to them by utilizing their prescheduled internship meetings to distribute the survey. The participants were briefed about the survey via hard-copy information sheet that included the link to the survey and the PI's contact information. The information sheet was also shared electronically using existing WhatsApp groups created by clinical nurse educators to share internship information. The graduates were given time to complete the survey during internship meetings or anytime within the next 30 days. The survey included a brief biography questionnaire to collect demographic information, GPA at graduation, history of failing at least one course during the program (yes/no), and campus affiliation. At the end of the survey, participants were directed to a link to register their interest in participating in one-on-one interviews and to obtain brief information



about the second phase of the study. Participants who were interested were asked to enter their preferred communication method (phone number and email address).

### ***Qualitative Phase***

Qualitative data was collected via 20–30 minutes one-on-one interviews using semi-structured open-ended questions. Participants were purposefully selected as a subset of the sample from the respondents to the UNSASS. The interview questions focused on three scopes: (1) What preadmission academic experience enhanced or hindered student success in nursing? (2) What program and personal factors facilitated or hindered participants' success in the GFP and nursing program? And (3) what program changes were likely to enhance students' learning experience and academic achievement?

All the interviews were conducted in English by a qualitative researcher from OCHS's quality assurance department who was not involved in any direct program activities. Selecting a nonfaculty researcher to conduct the interviews ensured that graduates felt comfortable expressing their opinions without fear of a power imbalance (i.e., in the faculty-student relationship). It also helped minimize potential bias related to the PI's preconceived notions about the educational environment at OCHS based on past work experience within the same institution.

### **Ethical Considerations**

Approval to conduct the study was obtained from the Ministry of Health, the Directorate General of Planning and Studies, and the University of Missouri Institutional Review Board. The PI sought permission and assistance from the directorate general of nursing affairs to access OCHS graduates. Alumni were informed that the study consisted of two components and that participation was voluntary. Participants who agreed to participate in the second phase were

informed that they could withdraw from the study at any point with no consequences. Written consent was obtained to audio record the interviews using Zoom. Participants were assured that the audio recordings would be destroyed at the end of the study. Additionally, to secure confidentiality of participants' data, both the survey and interview responses were anonymized; only the PI had access to them.

### **Quality of the Mixed-Methods Study**

The quality of a mixed-methods study is ensured by maintaining the quality of both the quantitative and qualitative strands of the study; by ensuring the quality of the mixed-methods design; and by assessing inferences generated from the entire study (Plano, et al., 2016).

Integration of quantitative and qualitative methods was implemented at three levels: (1) design level by utilizing an explanatory, sequential, mixed-method design (quan→QUAL) (Fetters, Curry, & Creswell, 2013), (2) methods level by using the data sample frame from the quantitative phase to select the sample for the qualitative phase, and (3) interpretation and reporting level by presenting the emergent findings of each phase jointly (Creswell and Plano Clark, 2018; Fetters et al., 2013).

### **Quantitative Analysis**

Statistical analysis was conducted using SPSS version 25. The survey responses were screened for missing data. Descriptive statistics and Pearson correlation were used to provide an overall view of student satisfaction across OCHS's nursing campuses and of the relationship between student satisfaction and academic success as defined by students' graduating GPA.

### **Qualitative Analysis**

The rigor of the qualitative phase was maintained by following four common criteria to determine the trustworthiness of research: credibility, dependability, transferability, and

confirmability (Moon et al., 2016). The 11 interviews were audio-recorded and transcribed verbatim. A reflective journal and memos covering any emerging concepts or ideas across the transcripts were maintained (Creswell & Poth, 2018). To establish credibility, a member-checking strategy was followed to elicit participants' feedback. After reading and rereading the transcripts, a follow-up email with the transcripts attached was sent to the participants, providing them the opportunity to add or elaborate on the content of the interview. Participants were also asked to review the language correction and ensure that it still reflected their responses (Meo-Jaffe, 2011). NVivo software was used for the data analysis. The data were then analyzed following structural and evaluation coding for the first cycle and pattern coding for the second cycle to summarize the codes into categories or themes (Saldana, 2016). Peer review was utilized as a second strategy to ensure credibility in which a qualitative expert cross-checked the coding process to ensure accuracy, quality, and consistency. After the peer review, a summary of the findings, including examples of participants quotations, was shared with interviewees to elicit their feedback on the findings and interpretation (Korstjens & Moser, 2018). To ensure dependability and confirmability, comprehensive documentation of the study design, its implementation, coding process, and rich quotes from participants was maintained to provide an audit trail and enable an external audit (Cope, 2014; Creswell & Poth, 2018).

## **Results**

### **Descriptive Statistics**

A total of 372 nursing graduates from all the nine nursing campuses were invited to participate in the study, from which, of 351 survey responses 91.1% (n= 339) were completed surveys. Table 1 shows the participants' characteristics profiles as well as their graduating GPAs.

The majority of the respondents were female (n = 290, 85.5%). About 40.6% of the respondents reported that their graduating GPA was 3.0 or higher, more than half (55.6%) reported graduating with a GPA ranging between 2.0 to 2.9, and 3.6% reported graduating with a GPA below 2.0 (See Table 4.9).

**Table 4.9**

*Descriptive Data of Survey Responses*

<b>Variables</b>		<b>No. of Subjects (n = 339)</b>
Gender	Female	290 (85.5)
	Male	49 (14.5)
History of failure	Yes	44 (13%)
	No	295 (87%)
Graduating GPA	3.75–4.0	7 (2.1%)
	3.0- < 3.75	130 (38.5%)
	2.0- < 3.0	188 (55.6%)
	1.6- < 2.0	12 (3.6%)

GPA Scale: 1 = D, 1.5 = D+, 1.74 = C-, 2 = C, 2.25 = C+, 2.75 = B-, 3 = B, 3.25 = B+, 3.75 = A-, 4 = A  
 Note. Data missing = 1

## Quantitative Findings

The findings in Table 4.10 suggest that nursing graduates perceived the quality of their educational environment to be somewhat adequate, with mean satisfaction (M = 3.47, SD = .63) across all nine campuses. The mean satisfaction per domain in descending order is program design and delivery (M = 3.58, SD = .59), clinical teaching (M = 3.55, SD = .61) student support services (M = 3.39, SD = .70) and faculty in-class teaching (M = 3.37, SD = .62), indicating that the graduates were least satisfied with faculty in-classroom teaching. The findings also indicate that participants' satisfaction varied between campuses. For example, among all the campuses, the lowest satisfaction was among participants in the Muscat campus across all the satisfaction domains—with the exception of the clinical teaching domain. Muscat was also the campus with the lowest graduating GPA (See Figure 4.4)

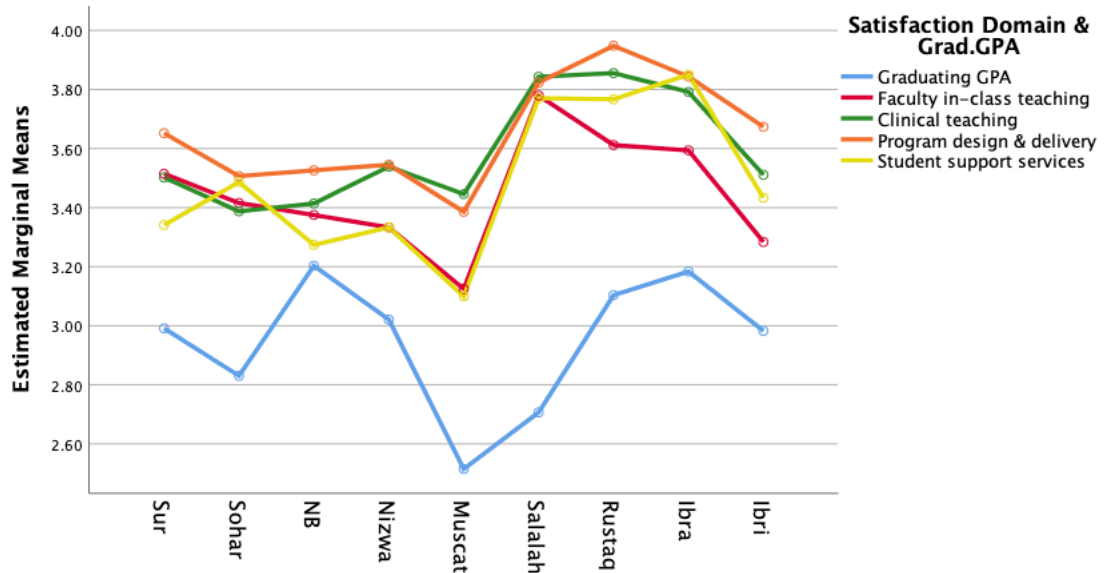
**Table 4.10**

*Mean Satisfaction Rate Across Campuses*

Campus	No. Survey Distributed	Response Rate N (%)	Faculty in-Class Teaching M (SD)	Clinical Teaching M (SD)	Program Design & Delivery M (SD)	Student Support Services M (SD)
Sur	34	34 (100)	3.51(.45)	3.50 (.50)	3.65 (.47)	3.34 (.61)
Sohar	29	29(100)	3.41(.66)	3.39 (.65)	3.51 (.68)	3.49 (.69)
NB	29	27(39.1)	3.37 (.55)	3.41 (.65)	3.53 (.54)	3.27 (.46)
Nizwa	29	24(82.7)	3.33 (.56)	3.54 (.71)	3.55 (.58)	3.33 (.59)
Muscat	130	118(90.7)	3.13 (.59)	3.45 (.63)	3.39 (.61)	3.12 (.78)
Salalah	35	34(97.1)	3.78 (.55)	3.84 (.53)	3.82 (.52)	3.77 (.50)
Rustaq	30	25(71.4)	3.62 (.49)	3.86 (.31)	3.93 (.39)	3.78 (.46)
Ibra	28	25(89.3)	3.59 (.65)	3.79 (.43)	3.84 (.44)	3.85 (.39)
Ibri	28	23(82.1)	3.28 (.69)	3.51 (.73)	3.67 (.64)	3.43 (.73)
Total	372	339(91.1)	3.37 (.62)	3.55 (.61)	3.58 (.59)	3.39 (.70)

**Figure 4.4**

*Mean Satisfaction Across Campuses*



Further examining participants' satisfaction revealed that out of 48 items, only 16 received a rating of 60% or higher. Table 4.11 displays the five highest- and lowest-rated items in the survey.

Although faculty support was not rated as strongly agree, the findings revealed that the majority of the participants agreed with the adequacy of support provided during in-class teaching (n = 238, 70.5%), facilitation of clinical learning (n = 212, 62.5%), and assistance in integrating theoretical learning into practice (n = 212, 62.5%). More than half the participants (52–56%) were also satisfied with the variety of courses offered in the program and the opportunities for teamwork with their colleagues.

The lowest satisfaction rates in which only 45% or fewer participants reported they agreed or strongly agreed, were found in four key areas in the faculty-in class teaching domain: (1) insufficient time to grasp the required learning, (2) opportunities to voice academic concerns (3), outlets to express student complaints, and (4) students’ feeling of not being valued as individuals. Further, only 45.2% participants expressed satisfaction with the adequacy and accessibility of clinical and computer labs.

**Table 4.11**

*The Five Greatest and Lowest-rated Items in the Survey*

	Number (Percentage)					M(SD)
	1	2	3	4	5	
<b>Items With Highest Satisfaction Rates</b>						
<b>Faculty in-Class Teaching</b>						
Faculty availability after class and during office hours	6(1.8)	24(7.1)	71(20.9)	188(55.5)	50(14.7)	3.74(.85)
<b>Clinical Teaching</b>						
Sufficient guidance before I perform technical skills.	8(2.4)	30(8.8)	89(26.3)	178(52.5)	34(10.0)	3.71(.83)
Encouragement to link theory to practice	4(1.2)	30(8.8)	93(27.4)	158(46.6)	54(15.9)	3.67(.89)
<b>Program Delivery and Design</b>						
Program design’s facilitation of teamwork among students	5(1.5)	25(7.4)	94(27.7)	177(52.2)	38(11.2)	3.71(.78)
Program’s provision of a variety of good and relevant courses	4(1.2)	17(5.0)	99(29.2)	191(56.3)	28(8.3)	3.65(.75)
<b>Items With Lowest Satisfaction Rates</b>						
<b>Faculty in-Class Teaching</b>						
Enough time to understand and learn the material.	19(5.9)	76(22.4)	93(27.4)	130(38.3)	21(6.2)	3.17(1.0)

Opportunities to express academic and other concerns to the administration	21(6.2)	65(15.3)	108(31.9)	126(37.2)	19(5.6)	3.17(1.0)
Channels for expressing students' complaints	19(5.6)	69(20.4)	111(32.7)	121(35.7)	19(5.6)	3.15(.99)
Administration's concern for students as individuals	19(5.6)	72(21.2)	121(35.7)	114(33.6)	13(3.8)	3.09(.96)
<b>Student Support Services</b>						
Adequacy and accessibility of computer and clinical labs	25(7.4)	50(14.7)	111(32.7)	128(37.8)	25(7.4)	3.23(1.0)
1 = strongly disagree, 2 = disagree, 3 = somewhat agree, 4 = agree, 5 = strongly agree						

## Satisfaction Level and Student Success

**Table 4.12**

*Correlation of Student Satisfaction and Graduating GPA*

	UNSASS Domain			
	Class Teaching	Clinical Teaching	Program Design & Delivery	Student Support Services
Graduating GPA	.119*	.121*	.228**	.156**
Significance levels are reported as follows: * $p < .05$ , ** $p < .01$ .				

Pearson's correlation was used to determine the association between students' graduating GPA and their satisfaction with the quality of educational environment. Table 4.12 shows that students' graduating GPA was positively correlated with all the four satisfaction domains: in-class teaching ( $r = .119$ ,  $p < .05$ ), satisfaction with clinical teaching ( $r = .121$ ,  $p < .05$ ), satisfaction with program design and delivery ( $r = .228$ ,  $p < .001$ ) and satisfaction with student support services ( $r = .156$ ,  $p < .001$ ).

**Table 4.13**

*Student Satisfaction and History of Failure*

UNSASS Domain	History of failure- Yes	History of failure - No	Mean Difference	95% Confidence Interval of the Difference
	M(SD)	M (SD)		
Faculty In-class Teaching	3.37 (.63)	3.57(.60)	.283**	.09 – .47
Clinical Teaching	3.12(.61)	3.41(.60)	.206*	.01 – .39
Program Design & Delivery	3.32(.63)	3.62(.58)	.298**	.11 – .48
Student Support Services	3.09(.84)	3.43(.66)	.342**	.12 – .56
Significance levels are reported as follows: * $p < .05$ , ** $p < .01$ *** $p < .001$				

T-test was also calculated to assess the difference in mean satisfaction among participants who experienced no failure in their academic experience in nursing and participants who experienced failure at least once. Table 4.13 shows that there was a significant difference in mean satisfaction in all four domains among students who graduated with no history of failure and students who graduated with a history of failure. The results suggest that graduates who failed at least one course during their course of study were less satisfied when compared to their counterparts.

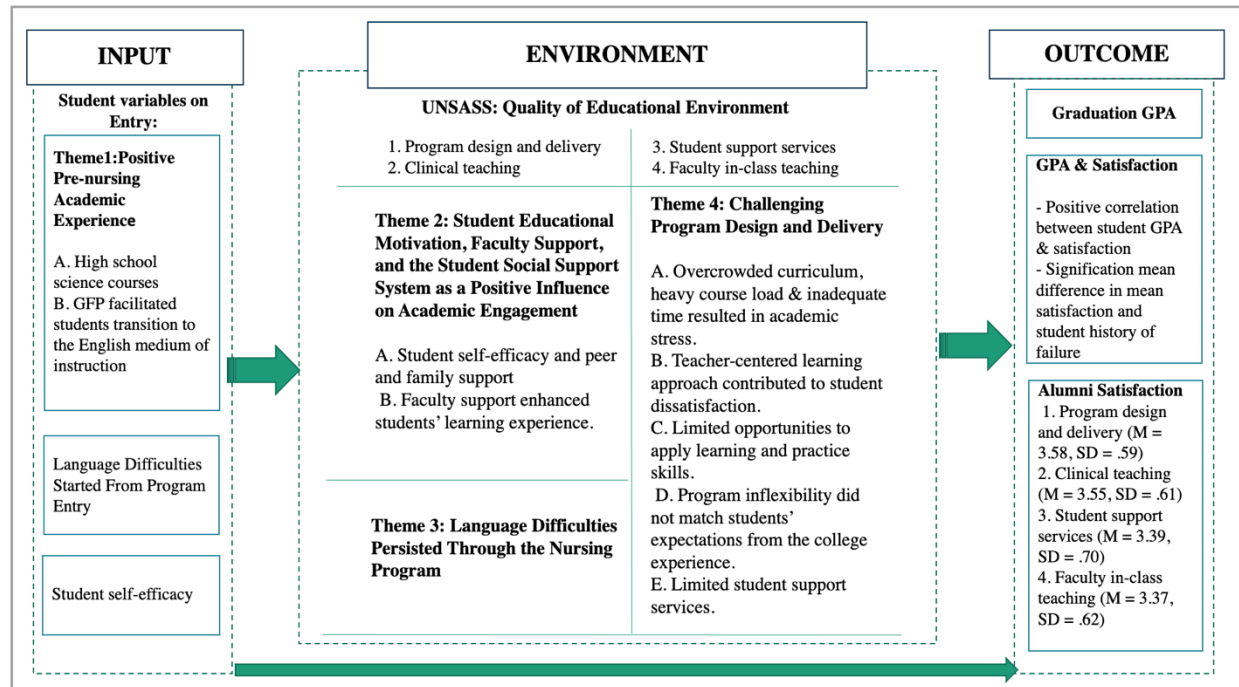
### **Qualitative Findings**

The qualitative analysis resulted in four themes and eight subthemes reflecting program and personal factors that contributed to or challenged students' academic success in both their prenursing academic experience and their nursing program trajectory at OCHS (See Figure 1). The four themes include: (a) positive prenursing academic experience, (b) student educational motivation, faculty support, and the student social support system as a positive influence on academic engagement, (c) language difficulties that started from program entry and persisted throughout the nursing program; and (d) challenging program design and delivery. Figure 4.5 illustrates a summary of findings from both the quantitative and qualitative phase based on Input-Environment-Outcome model.



**Figure 4.5**

*Results from the Quantitative & Qualitative Strands: Factors Influencing Nursing Student Success at OCHS in Accordance to Input-Environment-Outcome Model*



### **Theme 1: Positive Prenursing Academic Experience**

Participants reported that some of their past academic experiences in high school and in their GFP provided them a better opportunity for success in the nursing program.

#### ***1.1: High School Science Courses Were Most Helpful in the First Year of Nursing***

Overall, participants agreed that high school science courses facilitated their success in the nursing program. Participant 9 noted, “The scientific part of high school courses [were], I would say, biology, chemistry, and physics. Biology itself helped me in nursing, especially the first year when I studied nursing.” Another participant echoed a similar view by saying: “I am okay because some subjects in high school, like science, it’s like similar to subjects in nursing but, in high school, it was brief and in nursing, it’s like more in-depth.” (Participant 1).

#### ***1.2: GFP Facilitated Students’ Transition to the English Medium of Instruction***

Participants agreed that the 1-year GFP provided vital academic preparation for their college-level education:

Of course, General Foundation Program prepared us. It was as a transitional phase between high school and the nursing itself, so it helped us to cope more and, like, get used to the college itself, how we should study, learn about the system in the college. So, it prepared us well in terms of transition. (Participant 2)

Many participants also stated that the GFP helped them improve their academic skills in English:

When I started college, in the beginning, I did not know anything about English and the English Foundation program helped me to understand. I mean, I can understand a little better what teachers are saying, what they are discussing with us, what they are explaining to us. (Participant 3)

Participant 6 added, “The English courses were very helpful. I mean, we are coming from high school unprepared but, when I completed the foundation program, I was surprised that I scored that much in English courses.” Participant 4 also shared a similar view: “The foundation courses really strengthen your English skills. . . . I don’t think it should be skipped. It is really needed in nursing.”

## **Theme 2: Educational Motivation, Faculty Support, and Students’ Social Support Systems as a Positive Influence on Academic Engagement**

Participants highlighted a combination of self-efficacy, academic motivation, and social support systems as factors that contributed to their academic success.

### ***2.1: Student self-Efficacy and Peer and Family Support Positively Influenced Students’ Academic Performance***

Participants' statements made it clear that believing in their ability helped them cope with academic challenges:

I have positive thinking. If I don't pass on this subject, that does not mean I cannot do it. I think in a positive way, I can do it, I can study. That positive thinking helped me pass in all my subjects. (Participant 5)

Participants indicated that family and peer support contributed to their academic success. For example, Participant 6 shared an example of how peer support affected their educational achievement: "There was peer support. I mean, they explain whatever I did not understand in Arabic or in simple words." Participant 7 stated peers were a source of motivation: "My group of friends, they studied too much. That's why I studied with them. We were learning together, we are sitting and studying together." Participant 4 stated that studying with peers facilitated coping with academic stress and that "teamwork and collaborative work with other students" led them to believe "all the stressful objectives and requirements were much easier."

## ***2.2: Faculty Support Enhanced Students' Learning Experience***

All of the participants believed that faculty support was instrumental to their success. According to Participant 4, "The teachers were always approachable, whether for academic or non-academic issues." Another participant added, "The support that I got from some faculty made me succeed. . . . They always encouraged us to study and to read" (Participant 6).

## **Theme 3: Language Difficulties Started From Program Entry and Persisted Through the Nursing Program**

This theme reflected the academic difficulties students encountered in improving their English language competency to meet the requirements for studying in the English medium of instruction. The participants stated their inadequate English language preparation in high school

exacerbated their academic challenge regarding English language acquisition. For example, Participant 10 said, “In our high schools, the way they are, like, teaching English, it’s not that much, like, good. So mostly, we depend on ourselves learn English.”

Although the 1-year intensive GFP is designed to help students with language acquisition and study skills, some participants had mixed views of the program’s effectiveness. They thought it was insufficient to enhance their academic English skills:

I don’t think the foundation program prepared us for nursing. It was very poor. . . . Even the English [courses] . . . it [GFP] didn’t support us that much. . . . I think this foundation program need to be changed. . . . It didn’t benefit us. (Participant 1)

Another participant believed the fast pace of the GFP did not favor everyone: “Some students have circumstances; they cannot improve their English language fast” (Participant 8). Several participants described the International English Language Testing System (IELTS) as the most challenging part of the GFP. “During the foundation program, the IELTS subject . . . is a little bit difficult because of reading. We need to read in a short time, and we should answer a lot of questions” (Participant 1).

Participants’ struggles with the English language continued as they advanced in the nursing program. In fact, the expectation that they comprehend complex nursing content compounded their difficulties. This struggle was evident in participants’ descriptions of their stressful experiences during nursing courses: “Really, one of the challenges is my English language. . . . I need to spend so much time memorizing words, using them in sentences, writing essays. It is usually very stressful because our English skills were still growing. . . .” (Participant 8). According to Participant 5, “When you open the textbook, you found a lot of new information

and many new words that you can't understand without any help. . . . This makes it difficult for me because I need to study hard for many hours to understand everything.”

#### **Theme 4: Challenging Program Design and Delivery**

Most participants stated that feeling overwhelmed and stressed because of competing academic demands and insufficient time to grasp taught concepts reflected challenges in their learning experience that influenced their success. Participants also felt that the pedagogy instructors employed did not promote learning. Other participants expressed disappointment with the lack of academic support services and their unfulfilled expectations from the college experience.

##### ***4.1: An Overcrowded Curriculum, Heavy Course Load, and Inadequate Time Resulted in Academic Stress***

Many participants described how the organization of their educational plans and academic workload was too much to cope with in the given period. As Participant 4 said, “The amount of the subjects and the curriculum, the bundle of it was, like, overwhelming. Each semester, like, you’ll have too much to learn.” Participant 6 felt that taking many elective courses contributed to academic pressure: “There are many courses not related to nursing, like Entrepreneurship & Islamic Culture. These subjects added more pressure to us. . . how to divide our time. If you don’t focus on these courses, it will affect your GPA.” Participant 8 summed up the heavy course load: “It’s too much to study in a short period.”

##### ***4.2: Teacher-Centered Learning Approach Contributed to Student Dissatisfaction***

Coupled with the demanding course load, participants stated that the strategies teachers used in their nursing program did not promote learning: “Actually, they are giving lectures from one side and it’s, like, it doesn’t work. The faculty will proceed with their objectives, but student

objectives are not met. If there is interaction in class, it will be like more beneficial” (Participant 10).

Participant 5 expressed a similar sentiment: “In theory, we are only sitting in our chairs and the PowerPoint slides are on the board and the teacher is talking; we are only seeing and watching the slides.”

One participant reported that the teaching approach in the nursing program created additional academic stress:

Again, it’s the stress because there is a lot of new information. We do not understand some of the concepts because of the ways of teaching. It’s like more of traditional teaching and, like, presenting the ideas without examples, without further explanation; just reading from the slides. (Participant 4)

Another participant described the experience of coping with academic stress and ineffective teaching strategies, as well as the difficulties of comprehending complex nursing concepts because of the language barrier, all of which took a toll on the participant’s well-being:

The challenge actually is a lot of new information and many new words that we can’t understand without any help. . . . I go home [and] sit for hours and hours in my room studying and trying to read and study all the information that was not cover[ed] in class. . . . I needed to study hard. I didn’t sleep at all . . . thinking about how I will finish studying everything. I became psychologically sick. . . . When I saw my condition, I started taking things easy. I said to myself, I don’t not have achieve my ambition one-hundred percent, which is GPA 3.6 or 3.5. (Participant 5)

#### ***4.3: Limited Opportunities to Apply Learning and Practice Skills***

In addition to ineffective in-class teaching strategies, participants also dealt with challenges in clinical education

Limited opportunity to practice clinical skills was the most common challenge most of the participants faced, which they attributed to inadequate simulation labs or issues with clinical placement and supervision.

For barriers to success, I think it's the nursing lab. I think it did not prepare us well. I would like to give an example. Nursing colleges in like Sultan Qaboos University, they have mannequins like a real patient. The students are practicing before they go to a real patient. (Participant 6)

Sometimes they would put me in a ward that doesn't have basic procedures or [anything] at all. . . . There are some cases or diseases, and sometimes procedures, that I will not see in the clinical at all. Actually, I graduated without practicing IM [intramuscular] injection in real patients. (Participant 1)

Participant 11 also mentioned consequence of inadequate skill practice: "We finished the nursing program and we missed a lot of skills, basic nursing skills."

One participant felt that the amount of documentation required for clinical courses took away valuable time from patient care:

In the clinical also, the teacher is concern[ed] more about the paper that we need to submit at the end of clinical, I mean the NCP [nursing care plan]. Everything is related to that paper, NCP. . . . We don't have time. We don't have a chance to do procedures. We only want to fill this paper. (Participant 7)

#### ***4.4: Program Inflexibility Did Not Match Students' Expectations From the College Experience***

Some participants reported that the program characteristics (i.e., college class schedule and class enrollment) did not meet their college experience expectations. Although they did not view it as a challenge or a barrier to success, these characteristics were seen as a shortcoming in their experience. As Participant 5 said, “I discover[ed] that they select the course for us. We have no choice.” Participant 2 added:

The timing; studying every day for all of the semesters and for all the five years in the program from 7:30 am to 2:00 pm. . . . I mean, it’s like a high school, not like the other colleges in Oman. Like, that was a challenging factor. . . . We expected that we will have, like, afternoon classes and afternoon duty in the hospital or, like, a chance at least to choose the subjects we want to study this semester.

#### ***4.5: Limited Student Support Services***

In respect to educational facilities, different participants mentioned the inadequacies of various resources, such as inadequate academic advising, poor food service facilities, overcrowded dormitories, insufficient financial aid, and limited printing services and access to Wi-Fi. However, they placed greater emphasis on the campus infrastructure. For example, Participant 6 said, “The challenge was the campus building. . . . When you get free time, you will not get a place to study, [a] place to refresh yourself.” Another participant added, “The facilities available were not that much good when we started. It started to improve when we [were] nearly about to graduate” (Participant 9).

Other participants indicated that the limited financial support presented an additional challenge to the academic experience: “If student[s] have enough allowance, it will help the students in everyday life, and they would not think about studying and working at the same time because everybody needs money for life” (Participant 6).



According to Participant 7,

For projects, they let us pay for everything from our budget, nothing from the budget of [the] Institute. . . . We are paying for paper printing and buying other things from our allowance. No one helped us and some students' economical state is very low. . . . So, yeah, not all families can pay.

### **Discussion**

In reference to the Input-Environment-Output model, this mixed-methods study focused on what nursing graduates perceived as factors that contributed to or challenged their academic success by exploring the relationship between prenursing academic experience (inputs) and personal, and program-related factors (environment), and its influence on students' success (Figure 1). Beginning with the inputs, when asked about what factors from their high school education enhanced their experience in the nursing program, participants indicated that high school science courses (e.g., biology, chemistry) contributed to their early success in the nursing program. Studies on predictors of student success confirmed that students' academic achievement in high school science courses predicts their subsequent achievement in the nursing program (Lancia et al., 2013; Strickland & Cheshire, 2017; Wambuguh et al., 2016). It should be noted that while student performance in high school English courses is a core admission criterion for the nursing program at OCHS, participants mentioned the English course mostly to clarify that it had little to no value in easing the transition to college-level education. Participants had mixed views about the GFP; nonetheless, many of them reported that courses such as medical terminology and English offered GFP-enhanced student academic skills in English and thereby provided better opportunities for success. Others felt that the pace of the GFP was not suitable for all students who required additional academic support. Notably as participants voiced their

experiences of academic stress, they also repeatedly brought up their concerns about achieving a particular GPA. White (2012) observed that students in the health and sciences discipline, in Oman, are over-concerned with high grades. Being so consumed with attaining high GPA causes students to lose sight of the core objectives of their education and results in surface learning (White, 2012).

With respect to the educational environment, the findings from both UNSASS and in-person interviews uncovered several areas that can be improved to create a conducive environment for students to thrive. For example, the satisfaction rate for the time frame allotted to learning educational material (44.5%) was among the lowest-rated items in the survey. This finding was further highlighted by participants reporting an overcrowded curriculum, a heavy course load, and inadequate time to learn as challenges to their success. Participants used terms and phrases such as “stress,” “pressure,” and “too much to learn” to reflect their experience of coping with a demanding academic workload. In a systematic review, Chan et al. (2019) noted students’ inability to cope with academic demands and the unexpectedly heavy course workload is among the factors that contribute to student attrition.

Furthermore, participants identified the current method of teaching, a faculty-centered approach characterized by an overuse of PowerPoint, as a hindrance to learning and an additional source of stress. According to Al-Riyami (2017), in the quest for improving nursing education in Oman, the Ministry of Health has frequently consulted international experts to evaluate the nursing program at OCHS. Curriculum issues and teaching strategies have been identified as areas for improvement. Since then, OCHS has made efforts to address these areas of concern (Al-Riyami, 2017); however, the results of this study suggest that much more needs to be done to enhance learning. The OAAA (2013), noted that OCHS needed to implement a consistent

systemic plan to improve the pedagogical skills of faculty as well as a systemic mechanism for teaching evaluation across campuses (OAAA, 2013). Graham and Donaldson (2019) suggested that the traditional institutional logics in public higher education institutions hinders efforts to revise the curriculum by transitioning from traditional teacher-centered instructional practices to active learning. Available evidence demonstrates that lecturing results in rote learning rather than problem-solving learning (Salifu et al., 2018). Findings from this study suggest that lecturing is a common practice at OCHS and consequently, students are left trying to comprehend educational materials independently while also struggling to improve their English language competency. White (2012) reported that students' poor skills in English are a source of frustration for students in the health and sciences education field in Oman. In addition to the experience of multiple academic difficulties, the satisfaction rate on in-class teaching domain revealed that students perceived limited chances to freely express their academic concerns and grievances. Moreover, the majority of students at OCHS nursing program did not feel valued as individuals, which is not conducive to student motivation. Farmawy and Saad (2016) argued that fostering an educational culture that promotes safety and a sense of belonging can both foster a positive learning experience and promote student motivation. The aforementioned dissatisfaction seems to reflect issues relevant to campus climate and management rather than in-class teaching. However, Dennison and El-Masri (2012) suggested that student grievances and channels through which they can express academic concerns are conceptually related to faculty teaching.

While each campus differs in its student enrollment rate and potentially available resources, nursing graduates across all the campuses were the least satisfied with student support services, particularly the computer lab and the skills lab. Similar findings were revealed when participants were asked what program factors facilitated or challenged their success.

Participants believed that if the skills labs were better equipped with recent technologies (e.g., simulators), they would have a more positive clinical experience. Dube and Mlotshwa (2018) reported that nursing students perceive that the adequacy of learning facilities improved their academic achievement. In addition to the poor facilities, the structured course enrollments and class timings, which were no different from their experience in high school, were a source of disappointment because they did not satisfy students' expectations for the college experience. Current studies also noted that nursing students' expectations for their learning experience can influence their satisfaction, motivation, and behaviors (Chan et al., 2019; Hidalgo-Blanco, et al., 2020).

To provide insights into what was helping students on their academic trajectory, participants were asked to share their experience of what factors contributed to their academic success. Three key factors were extracted from students' statements: (2) faculty availability for support, (b) peer and family support, and (c) academic motivation. Findings from the survey corroborated participants' views on faculty availability to support students and on student collaboration and peer support. Some participants also attributed their persistence to self-efficacy. Earlier studies noted that nursing students perceived faculty support to positively influence their academic achievement (Cosper & Callan 2018; Dube & Mlotshwa 2018).

Studies on evaluating educational programs argued that given the complexity of such programs, it is crucial for the evaluation to extend beyond what is working well and what needs improvement, to "what works, for whom, and in what circumstances" (Stavropoulou & Stroubouki, 2014, p. 201). Clearly, at OCHS, the odds were not favorable to some students from the start given the fast pace of the GFP. This situation was further exacerbated by ineffective teaching approaches, inadequate academic support, and limited opportunities to verbalize one's

concerns. The importance of students' perceptions of their education climate cannot be further emphasized in this study because our analysis implied that student satisfaction with their educational climate is associated with students' graduating GPA. Furthermore, there was a significant mean difference in satisfaction between students who experienced no failure in their trajectory versus students who failed in at least one course.

To enhance student outcomes, faculty and school leaders need to acknowledge the complexity of educational programs and understand how multiple factors (e.g., student inputs, curriculum, and the educational environment) influence student satisfaction and academic success. Additionally, while using a survey is a common method for eliciting students' opinions regarding the quality of their learning experience, students' voices offer a deeper insight into what educational and personal factors shape their success. Such an approach is more likely to result in generating responsive and inclusive support strategies.

### **Limitations**

Although this study was a multi-site study, and the sample can be considered representative and comparable across OCHS campuses, the scope of generalization to other nursing schools may be limited. Additionally, the formal operational timing of OCHS is from 7:30 a.m. to 2:30 p.m., and school facilities are not available past 2:30 p.m. This may have affected the ecological validity of the current study (Gliner et al., 2017). Nonetheless, the evaluative focus of the study can inform other nursing schools regarding the factors that influence student academic success in nursing programs.

### **Conclusion**

This mixed-methods study aimed to examine factors that influence student academic outcomes by focusing on the relationship among student inputs, the academic environment, and

student success. With a clearer understanding of the interconnections among these three key elements in an educational program, the administration can develop a systemic approach to facilitating positive learning experience and promote student success by improving the quality of the educational environment.

Drawing on the findings collectively, our study showed that some of students' prenursing academic experiences, such as high school science courses, and GFP courses contributed to their persistence in nursing programs. Consistent with the available evidence, the educational environment, including (a) the curriculum structure, pace, and organization; (b) teaching approaches; (c) academic support services; and (d) a supportive educational climate, can influence both student satisfaction and academic success. Future studies can examine the association among students' demographics, personality traits, and satisfaction with the educational environment. Moreover, exploring faculty perspectives on student success factors and innovative teaching strategies can offer insights to guide improvements in the faculty's professional development and support services.

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## **Chapter 5**

### **Key Findings, Discussion, Conclusion, and Recommendations**

In previous chapters, I presented a brief introduction of the higher education system in Oman, discussed the background of OCHS, and noted the external pressures affecting the college's operations and student enrollment decisions. Chapter 2 included two published systematic literature reviews. The first literature review focused on the current practice of program evaluation in a baccalaureate nursing program. The primary findings of the review revealed that most evaluation studies in nursing education focused on summative evaluation, assessing program products with the purpose of meeting external accountability requirements. Moreover, multiple studies highlighted students' perspectives on their learning experiences; nonetheless, most of the reviewed studies relied on quantitative data for program evaluation. The review informed the design of the current dissertation because it emphasized the importance of studies with mixed methods in educational evaluation due to their ability to offer a more comprehensive depiction of program components. The mixed-methods approach lends itself to using quantitative and qualitative approaches, as well as multiple data sources, thereby identifying connections among various findings (Al-Alawi & Alexander, 2019). The second published manuscript mentioned in Chapter 2 focused on predictors of student success. This manuscript informed the current study on the widely examined variables used to recruit students who are more likely to succeed in a nursing program. The findings emphasized the importance of assessing the influence of students' nonacademic characteristics and educational environment factors on student success (Al-Alawi et al., 2020). Chapter 2 also included a brief literature review on the quality of the educational environment and student learning experience. The

findings from the review highlighted the importance of drawing connections between students' perceptions of their learning experience and their academic outcomes.

Chapter 3 included details on the study plan and the methodology, and Chapter 4 incorporated two manuscripts presenting the results of this dissertation. The first manuscript focused on the first part of the quantitative phase, answering five research questions using a retrospective analysis of student academic records. The second manuscript incorporated the second part of the quantitative and the qualitative phases and addressed the sixth research question. The present chapter provides an overview of the study, key findings, discussion, recommendations, and implications for future studies.

This sequential, explanatory, mixed-methods study aimed to examine the factors influencing nursing students' academic success at OCHS. Astin's (2012) Input–Environment–Outcome model, which assesses higher education effectiveness, guided this study. Inputs included student demographics and preadmission academic characteristics (i.e., high school GPA and achievement in high school English, biology, and chemistry courses). The environment entailed four domains of the educational environment: (a) faculty in-class teaching, (b) clinical teaching, (c) program design and delivery, and (d) student support services. Outcomes included student satisfaction rate and student success defined by (a) the attrition rate, (b) the retention rate, (c) the graduation rate, (d) student scores in the GFP English Level–3 course, (e) CGPA at the end of each year in the nursing program, and (f) graduating GPA (Figure 1). Astin (2012) emphasized that the relationships between the input, environment, and outcome are interdependent, and thus assessing the educational effectiveness is complete only if the three constructs are evaluated jointly. In this study, the student inputs and environment were the independent variables, and the dependent variables were student success and student satisfaction.

The first phase of the study was the quantitative phase, which included two parts—the first of which was a retrospective analysis of student academic records. This part of the quantitative phase addressed the first four questions of the study by evaluating the relationship between the student inputs (i.e., student demographics and preadmission variables) and student outcomes—particularly scores in the GFP English Level–3 course and CGPA at the end of each year of the nursing program. The second part of the quantitative and qualitative phases addressed the fifth research question, which focused on eliciting nursing graduates’ views on the factors that contributed to or hindered their academic success during their course of study. Below, I present a summarized finding for each question followed by a discussion.

### **Summary of Key Findings**

#### **Research Question #1**

What are the student success rates, as defined by student retention, attrition, and success rates for the nursing graduates of 2018? Based on the demographic questionnaire in which the nursing graduates reported their history of failure in at least one course ( $n = 41$ ), the student retention rate was 15.4%, and the success rate was 84.6%. We were not able to calculate on-time program completion and student attrition rates because of missing data.

#### **Research Question #2**

What is the relationship between students’ scores in high school English course and their subsequent GPAs at the end of both the GFP and each academic year in the nursing program? The results showed that students’ high school English scores were significantly correlated with student CGPA only at the end of Year–1 of the nursing program, indicating that students who obtained a higher grade in their high school English class had a higher CGPA at the end of their first year of the nursing program.

### **Research Question #3**

What are the relationships among the student demographics, the current admission criteria used by OCHS, student on-time completion of the program, and student cumulative GPA at the end of each year in the nursing program? Student success in the high school English course significantly predicted students' Year-1 CGPA and their Year-2 CGPA. Both high school science courses, biology and chemistry, were predictive of student success in their second year of nursing, indicating that students with higher scores in preentry science courses were more likely to have higher CGPAs in their second year of nursing. The students' average high school scores significantly predicted their Year-1 CGPAs. When examining the contribution value of each predictor of the admission criteria, the findings indicate that these variables were weak predictors of student success.

In respect to student demographics and student academic achievement in the nursing program, being a female student was a strong, significant predictor of student success for all four years of nursing study. Living at home was also a statistically significant predictor of student CGPA at the end of each year in the nursing program, with the exception of Year-3 CGPA.

### **Research Question #4**

To what extent can a student's achievements in the GFP be used to predict the student's GPA at the end of each academic year in the nursing program? The findings suggest students' English Level-3 scores were a consistent predictor of student CGPA at the end of each year of the nursing program. The English Level 3 scores accounted for more than 25% of the variation in student CGPA in the first two years of their studies.

### **Research Question #5**



What are the best predictors of nursing student academic achievement in the context of OCHS? Three variables showed consistent predictive value to academic success: (a) gender, being a female, (b) history of failure, and (c) student performance in English Level–3. The other variables were not uniquely beneficial in predicting student success in the nursing program, with the exception of high school chemistry course scores, which were predictive of Year–3 CGPA. Additional analysis was conducted to better understand variation of student academic success across campuses. The findings showed that campus affiliation is also a significant predictor of student success and that the student population differed in their characteristics from one campus to another.

#### **Research Question #6**

What factors do OCHS graduates perceive as contributors or hindrances to student success? The overall findings from the alumni responses to the UNSASS suggested that the graduates were somewhat satisfied with the quality of their educational environment. The highest satisfaction rate was noted in survey items pertaining to program design and delivery domain, followed in order by clinical teaching, student support services, and faculty in-class teaching. The results also revealed that the mean satisfaction of each domain was positively correlated with the students' graduating GPAs.

The qualitative phase resulted in four themes that emerged as influential factors of student success: (a) positive prenursing academic experience, (b) student educational motivation, faculty support, and student social support system as a positive influence on academic engagement; (c) language difficulties throughout the nursing program; and (d) challenging program design and delivery.

## Discussion

For this section, the findings are discussed in accordance to Astin's I-E-O model (See **Error! Reference source not found.**).

### Student Inputs and Academic Success

#### *Academic Characteristics*

When examining student input on entry to the program and its contribution to student success, our findings align with previous studies that indicate that student academic performance in high school science courses is a predictor of early student success in the nursing program (Ali & Naylor, 2010; Lancia et al., 2013; Strickland & Cheshire, 2017; Wambugh et al., 2016). These findings also align with findings from the qualitative phase, in which participants indicated that high school science courses (e.g., biology and chemistry) contributed to their early success in the nursing program.

Moreover, the high school mean score significantly predicted student success in Year-1 and Year-3 of the student trajectory. However, the findings demonstrated that the students with higher grades in high school English course were more likely to have lower CGPAs in the first two years of nursing. This result was further validated by alumni who stated in their interviews that English high school course had little to no value in easing the transition to college-level education. However, this finding did not agree with earlier studies, in which Gilmore (2008) found that students' English ACT subscores were a statistically significant predictor of academic achievement in nursing.

Overall, with regard to entry criteria, the participants perceived that high school science courses facilitated their success in nursing, nonetheless, the results from the quantitative phase indicate that the predictive value of all the variables that comprise the admission criteria (i.e., the

student's average high school score and the student's scores in high school biology, chemistry, and English) is weak, rendering the entry criteria only marginally helpful in predicting student success or identifying students who are at risk for failure and who require academic support early on in the program.

In addition to being weak predictors, when assessed jointly with other demographic variables, all the entry variables—with the exception of chemistry course—were deemed ineffective in predicting nursing students' academic achievement in the nursing program. This particular finding cannot be overlooked and requires further investigation because average high school grade and student scores in biology, chemistry, and English are used as key determinants for entry to nursing and other health-related disciplines at OCHS.

### ***Student Demographics***

Two key nonacademic variables were found to be strong predictors of student academic success: (a) being female and (b) living at home. The findings suggest that female students are likely to surpass male students by half a point (0.5) or more at the end of each year of their study. Furthermore, those students who live at home are likely to outperform their counterparts by 0.2 points at the end of each year in the nursing program but not during year-3. Both findings are in agreement with earlier studies. Many studies have reported that being female is associated with student success in nursing (Ali & Naylor, 2010; Dante et al., 2013; Lancia et al., 2013; Lancia et al., 2018). Wray et al. (2012) noted that the students who experience a change in their residence arrangement for the purpose of attending school are less likely to progress in their studies when compared with students who remain in their permanent residence. This may be because students who live in the dorms have to cope with living away from family while also navigating college life (Wray et al., 2012).

To further explain why student academic performance differed from one campus to another, the analysis revealed that campus affiliation was a significant predictor of student success. Clearly, students from the Muscat campus and Sohar campus attained the lowest CGPA at the end of each academic year when compared with students from other campuses. With the intent to understand the discrepancy in student achievement across campuses, we dissected the data of the student population per campus based on entry criteria and demographics (See Table 4.8). Notably, characteristics of the Muscat campus's student population included most of the variables that are negatively influential to academic success. For example, these students had the lowest average high school scores on entry, and a higher number of these students lived in dormitories and experienced failure in at least one course during their studies—all of which negatively affect student success.

### **Educational Environment and Academic Success**

As mentioned earlier, for this study, the educational environment included the four emergent themes from the qualitative phase in addition to the four domains assessed by UNSASS (i.e., faculty in class teaching, clinical teaching, support services and program design and delivery). Below I discuss the key findings based on the themes.

#### ***GFP Facilitated Students' Transition to the English Medium of Instruction***

Our findings showed that the majority of participants perceived their GFP experience positively. When asked about what GFP factor facilitated their academic success, many of them reported that the medical terminology course and English courses offered GFP-enhanced student academic skills in English and thereby provided better opportunities for success.

#### ***Language Difficulties Throughout the Nursing Program***

As noted earlier, many participants felt that the high school English course was far from being insufficient for an English medium of instruction. Although the GFP is intended to bridge the gaps in English academic skills, some participants felt that the pace of the GFP program was not suitable for all students who required additional academic support. Others reflected on the academic difficulties students encountered in improving their English language competency to meet the requirements for studying in the English medium of instruction, particularly in reading and in the International English Language Testing System.

Student challenges with English as the medium of instruction corroborate and explain the findings from the quantitative phase: students with higher scores in an English Level-3 course are likely to have higher CGPAs at the end of each academic year in the nursing program. In fact, student achievement in English Level-3 accounted for 32% of the variation in student CGPA in the first year of nursing.

### ***Challenging Program Design and Delivery***

Other prominent challenges encountered by the nursing graduates in their educational environment were related to program design and delivery. The participants noted feeling overwhelmed and stressed because of competing academic demands and insufficient time to grasp taught concepts. Participants also felt that the teaching pedagogy did not promote learning. Other participants expressed disappointment with the lack of academic support services and their unfulfilled expectations of the college experience. We summarized all these challenges into five categories: (a) an overcrowded curriculum, heavy course load, and inadequate time resulting in academic stress; (b) a teacher-centered learning approach prompting student dissatisfaction; (c) limited opportunities to apply learning and practice skills; (d) program inflexibility that did not meet students' expectations of the college experience; and (e) limited student support services.

The above findings are in agreement with the findings from UNSASS; the satisfaction rate for the time frame allotted to learning educational material (44.5%) was among the lowest-rated items in the survey. Nursing graduates across all the campuses were the least satisfied with student support services, particularly the computer lab and the skills lab. Additionally, the lowest satisfaction rates, in which only 45% or fewer participants reported they agreed or strongly agreed, were found in four key areas in the faculty in-class teaching domain: (a) insufficient time to grasp the required learning, (b) opportunities to voice academic concerns, (c) outlets to express student complaints, and (d) students' feelings of not being valued as individuals.

***Student Educational Motivation, Faculty Support, and Student Social Support System as a Positive Influence on Academic Engagement.***

On the positive side, the participants shared their experience of what factors contributed to their academic success. Three key factors were extracted from students' statements: (a) faculty availability for support, (b) peer and family support, and (c) academic motivation. The findings from the survey corroborated participants' views on the following: faculty availability to support students, student collaboration, and peer support. Some participants also attributed their persistence to self-efficacy. Earlier studies noted that nursing students' perception on faculty support positively influenced their academic achievement (Cosper & Callan, 2018; Dube & Mlotshwa, 2018).

**Outcomes**

Our findings show that student academic characteristics (entry criteria, student performance on English Level-3, and failure in at least one course) and demographics (gender and living arrangement) influence student success. The results also indicate that student satisfaction with the quality of their educational experience correlated positively with student

academic achievement at the end of the program. Moreover, exploring students' perception about their learning experience in the program offered a better understanding of how the educational environment affects both student satisfaction and student academic success. For example, many participants mentioned second year courses such as pharmacology and adult health when commenting on the demanding course workloads and insufficient time to grasp the taught information. Our retrospective analysis of student academic records also showed a sharp decline in student CGPAs at the end of Year-2, which may be explained by an unexpectedly heavy course workload.

To enhance student outcomes, faculty and school leaders need to acknowledge the complexity of educational programs and understand how multiple factors (e.g., student inputs, curriculum, and the educational environment) influence student satisfaction and their academic success. Additionally, although using a survey is a common method for eliciting students' opinions regarding the quality of their learning experiences, students' voices offer a deeper insight into what educational and personal factors shape their success. Such an approach is more likely to result in generating responsive and inclusive plans for support strategies.

### **Conclusion**

Student success is a core indicator of program effectiveness in nursing education. Moreover, student failure or delay in progression is a costly challenge. It burdens the already limited educational resources, financially taxes both the students and the educational institution, and hampers the effort to effectively respond to the growing demand for more nurses in health care settings. Thus, identifying students who are at risk for failure at an early stage of a nursing program is a vital research topic. This mixed-methods study aimed to examine the factors that influence student academic outcomes by focusing on the relationships among student inputs, the

academic environment, and student success. With a clearer understanding of the interconnections among these three key elements in an educational program, the administration can develop an effective systemic approach to facilitating positive learning experiences and promoting student success by improving the quality of the educational environment.

### **Challenges and Limitations**

There were several challenges and limitations to this dissertation work. The following section will provide a brief description of the study's primary limitations and some of the difficulties encountered in the process of data collection, management, analysis, and interpretation.

#### ***Challenges***

**Data Collection.** Challenges encountered during the data collection phase included difficulty in accessing complete data sets and the lack of clear, official policies in regard to using student records for research. OCHS has recently adopted an electronic student records system. Student data are entered into the system retrospectively, and campuses were at different points in the data entry process. Additionally, the system data were limited to student grades in the nursing program. Entry data, demographics, and student achievement in GFP were not provided in the system. Ultimately, to ensure that the data were collected within the planned timeframe, opting to use an Excel sheet, which is the traditional method used to save student data, appeared to be a better option. Permission to conduct the research was obtained from the Directorate General of Research and Planning at the Ministry of Health, and the research department at OCHS granted permission to access the data. Nonetheless, accessing the Excel sheets was hampered by bureaucracy, multiple meetings, and a lack of policies and guidelines on student confidentiality



and data usage for research. Although no agreement was signed, access to the data was granted after 4 months.

**Data Management.** Campuses saved student grades in multiple Excel sheets organized by semester, which required the PI to merge 14 sheets per campus and then merge the data from all nine campuses into one document. The process also included the checking and rechecking of data merge accuracy by an administrative assistant who was hired to assist the PI. Student entry data and grades from GFP were missing in some of the campuses, which resulted in the exclusion of two campuses. Data on student attrition and retention were also missing across all campuses.

**Data Analysis and Interpretation.** The study was composed of two phases—the quantitative phase, which consisted of two parts, followed by the qualitative phase. As a result, the study generated a large amount of data, which made synthesizing and summarizing the findings a challenging process.

### ***Limitations***

Based on the inherent nature of this study, there are limitations that may influence its external validity. Some of these limitations include the following:

- This study used nonprobability convenience sampling, recruiting one student cohort from the OCHS nursing program. This type of sampling limits the ability to generalize the study's findings.
- The study setting, OCHS, has a unique structure in terms of school context and operation timing; students complete their daily classes within a structured time frame from 7:30 a.m. to 2:30 p.m. Hence, school facilities are not available after 2:30 p.m. This unique operation timing may affect the ecological validity (Gliner et al., 2017).

- Data from both the retrospective analysis and survey responses were limited to students who completed the program within the required time frame. As a result, some important information on student success and satisfaction from students who failed to graduate on time may have been overlooked.

There are three potential threats to the internal validity of this study:

- There are some confounding variables (e.g., student aptitude, motivation, and personality traits) that may influence student success, but are beyond the scope of the current study (Shadish et al., 2002).
- The study also analyzed student GPAs acquired from a period of 5 years. Thus, it is possible that changes in student GPA are due to student academic maturation and the acquisition of learning experience, study skills, and language proficiency (Shadish et al., 2002).
- The measures used for most of the analyses relied on student grades earned in high school and student GPAs at the end of the nursing program. Although the grading scheme for the 12th grade of high school is standardized nationally and the nursing GPA scheme is consistent across all campuses, such measures do not eliminate the possibility of grade inflation. Hence, solely relying on grades and GPA as measures requires cautious interpretation of data (Al-Alawi et al., 2020).

Nonetheless, because all high school graduates undergo a similar process of admission and a similar precollege GFP, the findings can inform other nursing programs about influential factors of student success.

## **Recommendations**

This study thus offers two recommendations: The first set of recommendations includes suggestions to enhance student learning experiences and academic outcomes, and the second set of recommendations consists of implications for future studies.

### **Program Improvement Recommendations**

1. OCHS may benefit from revisiting the policies and guidelines regarding student data management and thereby ensuring consistent data archives across all campuses. The college may also consider collecting data on student demographics. It was apparent that the data management system was newly established; nonetheless, it did not include student demographics beyond age and gender and lacked information on attrition and retention (i.e., students who failed but were able to persist and graduate within the time frame). Data analysis is key to program evaluation and evidence-driven quality improvement.
2. The college may also consider establishing clear guidelines and agreements for data sharing and data usage for institutional research. First, a data sharing agreement can facilitate retrieving student entry data from the Higher Education Admission Center in a convenient manner. Second, guidelines on data usage for institutional research can ease the process of data access and promote the use of data to inform decision-making regarding curriculum revision and program improvement. Guidelines can also encourage research using student data and ultimately enhance student outcomes.
3. After reviewing the graduates' perception of their educational environment, notably, the need to improve the teaching pedagogy across all nursing campuses cannot be ignored. Our findings align with the OAAA (2013) audit report which suggested that

- OCHS need to provide professional training to promote the use of innovative teaching strategies and establish systemic teaching evaluation processes.
4. OCHS may also need to evaluate the status of educational resources, particularly the skills lab to ensure it reflects the rapidly changing technologies in health care education. The college also needs to ensure that students have access to additional support in the skills lab when needed.

### **Recommendations for Future Studies**

In regard to research implications, our literature review revealed limited evaluation studies related to nursing student success in Oman overall and at OCHS in particular. Although this study lends itself to a comprehensive review of factors influencing student academic success at OCHS, there is much more left to learn.

1. This study can be replicated using complete data sets of other baccalaureate cohorts to assess patterns, trends in student success and determine changes, if any, in predictors of student success as well as student satisfaction with their educational environment. Such studies could be sources of actionable data for quality improvement.
2. Our findings showed that student populations varied in their characteristics from one campus to another. In acknowledging that variation, future researchers could also consider conducting a retrospective analysis of student records at individual campuses.
3. Prospective researchers could consider exploring faculty perspectives on student success factors and innovative teaching strategies; such perspectives can guide improvements in the faculty's professional development and support services.
4. As we concluded in our study, educational programs are complex systems, and multiple factors can influence student academic success. Hence, OCHS can benefit from studies

examining the relationships among student demographics, personality traits, and satisfaction with their educational environment. Moreover, studies evaluating the relationships among student personality, academic motivation, and student success can broaden the understanding of nursing student outcomes at OCHS.

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### Systematic review: Predictors of students' success in baccalaureate nursing programs

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### Systematic review of program evaluation in baccalaureate nursing programs

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BACK

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## Appendix B

### Undergraduate Nursing Student Academic Satisfaction Scale (UNSASS)

**Table 1**

*Undergraduate Nursing Student Academic Satisfaction Scale*

Please answer the following items to your best ability

Student ID		
Gender identity		
1 – Male	1 – Female	
Age on admission to the program		
What kind of secondary school did you attend?		
1 – Public	2 – Private	
Are you first individual from your family to attend college?		
1 – Yes	2 – No	
Where did you complete the nursing program?		
1 – Muscat	2 – Sur	3 – North Batina
4 – Nizwa	5 – Ibri	6 – Rustaq
7 – Ibra	8 – Sohar	9 – Salalah
While attending the nursing program, were you:		
1 – Single	3 – Married	3 – Got married during the program
During your study in the program, you lived:		
1 – Home	2 – Dormitory/hostel	
During you study in the nursing program, did you fail or retook a course?		

1 – Yes

2 – No

What was your graduating GPA upon completion of the nursing program? (Please use numerical values e.g. 3.5)

This survey is designed to assess your satisfaction with nursing program at Oman Health Sciences College. To best answer each question, please relate each question to your overall personal experience as a student in the program.

Please rate how strongly you agree or disagree with the below statements by marking the appropriate box.

### Faculty In-class Teaching

1. I was able freely express my academic and other concerns to faculty members	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
2. Faculty members were easily approachable	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
3. Faculty members made every effort to assist students when asked	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
4. Faculty members made an effort to understand difficulties I might be having with my course work.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
5. Faculty members were usually available after class and during office hours	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
6. I could freely express my academic and other concerns to the administration	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
7. Faculty members were fair and unbiased in their treatment of individual students.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree

8. Faculty members provided adequate feedback about student's progress in a course.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
9. I received detailed feedback from faculty members on my work and written assignments.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
10. Channels for expressing student's complaints were readily available.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
11. Faculty members were good role models and motivated me to do my best.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
12. The administration showed concerns for students as individuals.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
13. Faculty members demonstrated a high level of knowledge in their subject area.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
14. Faculty members took the time to listen/discuss issues that may impact my academic performance.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
15. Faculty members created a good overall impression.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
16. I was generally given enough time to understand the things I have to learn.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree

### Clinical Teaching

17. Clinical instructors were approachable and made students feel comfortable about asking questions.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
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18. Clinical instructors provided feedback at appropriate time and did not embarrass me in form of others (classmates, staff, patient, and family members)	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
19. Clinical instructors were open to discussions and difference in opinions.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
20. Clinical instructors gave me sufficient guidance before I perform technical skills.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
21. Clinical instructors viewed my mistakes as part of my learning.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
22. Clinical instructors gave me clear ideas of what is expected from me during a clinical rotation.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
23. Clinical instructors facilitated my ability to critically assess my client's needs.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
24. Clinical instructors assigned me to patients that are appropriate for my level of competence.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
25. Clinical instructors gave me verbal and written feedback concerning my clinical experience.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
26. Clinical instructors demonstrated a high level of knowledge and clinical expertise.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
27. Clinical instructors were available when needed.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree



28. Clinical instructors provided enough opportunities for independent practice in the lab and clinical sites.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
29. Clinical instructors encouraged me to link theory to practice.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
30. Instructions were consistent among different clinical and lab instructors.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
31. Faculty members behaved professionally.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree

### Program Design & Delivery

32. This program provided a variety of good and relevant courses.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
33. The program enhanced my analytical skills.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
34. Most courses in this program were beneficial and contributed to my overall professional development	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
35. The quality of instruction I received in my classes is good and helpful.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
36. I usually had a clear idea of what is expected of me in this program.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
37. The program was designed to facilitate teamwork among students.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
38. The program enhanced my problem solving or critical thinking skills.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree

39. There was commitment to academic excellence in this program.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
40. As a result of my courses, I felt confident about dealing with clinical nursing problems.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
41. Going to class helped me better understand the material.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
42. I was able to experience intellectual growth in the program.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
43. Overall, the program requirements were reasonable and achievable.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
<b>Support &amp; Resources</b>					
44. The secretaries were caring and helpful.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
45. The secretaries behaved professionally.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
46. Support at the clinical and computer labs was readily available.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
47. Computer and clinical labs were well equipped, adequately staffed, and were readily accessible to meet	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
48. The facilities (classrooms, clinical and computer labs) facilitated my learning.	<input type="checkbox"/> Strongly agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Somewhat Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree

## Appendix C

**Table 2**  
*Interview Question Guide*

Pre-admission	<ul style="list-style-type: none"> <li>Do you believe that your high school performance prepared you for college (particularly the nursing program)? If so, can you tell me in what ways your high school performance prepared you for college education (nursing program)?</li> </ul>
General Foundation Program	
Program-related factors	<ul style="list-style-type: none"> <li>In what ways did your educational experience in the General Foundation Program (GFP) prepare you for the nursing program?</li> <li>What was the most difficult aspect of the GFP?</li> <li>What positive factors (if any) influenced your academic performance in the GFP?</li> <li>What factors (if any) hindered your academic performance in the GFP?</li> </ul> <p><b>Probe.</b> Program factors: faculty–student interaction, satisfaction with classroom experience and teaching strategies, simulation/lab experience, satisfaction with the clinical placement and experience, etc.</p>
Personal factors	<ul style="list-style-type: none"> <li>As a nursing graduate, can you share what individual/personal factors helped you succeed in the program?</li> </ul> <p><b>Probe.</b> Personal factors: time management, class attendance, student engagement in school activities, family support, student motivation, commitment to receiving a nursing degree, etc.</p>
Recommendations	<ul style="list-style-type: none"> <li>What, if anything, would you change about the foundation program? Explain why.</li> </ul>
Nursing program	
Program-related factors	<ul style="list-style-type: none"> <li>Reflecting on your learning experience in the nursing program, what aspect of the program was most challenging?</li> <li>Which positive factors in your learning experience in the nursing program influenced your success?</li> <li>What factors in your learning experience in the nursing program hindered your success?</li> </ul>

	<p><b>Probe.</b> Program factors: faculty–student interaction, satisfaction with classroom experience and teaching strategies, simulation/lab experience, satisfaction with the clinical placement and experience, etc.</p>
Personal factors	<ul style="list-style-type: none"> <li>• As a nursing graduate, can you share what individual/personal factors helped you succeed in the program?</li> <li>• If you were given the opportunity to study in the nursing program again, what you would do differently?</li> </ul> <p><b>Probe.</b> personal factors: time management, class attendance, student engagement in school activities, family support, student motivation, commitment to receive a nursing degree, etc.</p>
Recommendations	<ul style="list-style-type: none"> <li>• What changes to the program would you suggest to better promote student success?</li> </ul>

## Appendix D

### Informed Consent – Phone & Email Script

Hello:

My name is Reem Al-Alawi, and I am a doctoral nursing student at the University of Missouri. I am conducting a research study entitled **Evaluation Study: Predictors of Student Success in Oman College of Health Sciences Nursing Program**.

#### Purpose of the Study

In this study, I explore the factors that influence Omani nursing students' success at the Oman College of Health Sciences.

#### Participation Eligibility

If you meet the following criteria, you are eligible to participate in this study:

1. You are student from the **first baccalaureate cohort of the nursing program** at Oman College of Health Sciences.
2. Graduated **summer 2018**
3. Completed the Undergraduate Nursing Student Academic Satisfaction Scale survey

#### Interview Procedure

Your participation will involve a one-on-one interview conducted on-site or via video in accordance with your preferences and convenience. The interview questions will focus on your educational experience during your enrollment in the nursing program and factors that contributed to or hindered your success in the program. The interview will be approximately 60 minutes in length. Your interview will be recorded, and the results of the study will be published without your name or identifying information. This information will not be shared or revealed beyond the scope of the study at any point of time.

There will be no direct benefit to you from participating in this study. However, the information we obtain from you will contribute to improving the quality of the nursing program and assist faculty in better planning support measures to promote student success.

In return for your time to participate in the interview, you will be compensated with a prepaid phone credit worth one Omani Rial.

#### Potential Risk

There is no foreseeable risk or discomfort associated with participating in this study

## Rights of Research Participants

Please be informed that your participation is voluntary. You have the right to change your mind or to withdraw from the study at any time, and you can do so without any penalty or loss of benefit to yourself. You can also refuse to answer any question that you do not want to answer.

Thank you for your consideration. If you have any questions about this study at any time, you can call **Reem Al Alawi** at

**Phone No.:** +986 99878881.

**Email:** [raaz85@mail.missouri.edu](mailto:raaz85@mail.missouri.edu)

Before you decide whether to accept the invitation and participate in this study, please ask for any clarifications or questions that may come to your mind now. Later if you have any concerns about the interview you can contact the investigator Reem Al Alawi, phone No. **Phone No.:** +986 99878881.

If you have read this information and agree to take part of the study, please sign below and email a copy to me.

---

Name of the person agreeing to take part of the study

---

Date

---

Signature of the person agreeing to take part of the study

---

Date

## الموافقة المسبقة - الهاتف والبريد الإلكتروني

تحية طيبة وبعد،

اسمي ريم العلوي، وأنا طالبة دكتوراة في تخصص التمريض في جامعة ميسوري. أقوم حالياً بإجراء دراسة بحثية بعنوان "دراسة تقييمية: عوامل نجاح الطلاب في برنامج التمريض بكلية العلوم الصحية بسلطنة عمان"

### الغرض من الدراسة

تتناول هذه الدراسة العوامل التي تؤثر على نجاح طلاب التمريض العمانيين في كلية العلوم الصحية بسلطنة عمان.

### أهلية المشاركة

إذا كنت مستوفياً للمعايير التالية، فأنت مؤهل للمشاركة في هذه الدراسة:

1. أحد طلبة الدفعة الأولى لبرنامج بكالوريوس برنامج التمريض في كلية عمان للعلوم الصحية.
2. تخرجت في صيف 2018
3. أجبت على الدراسة الاستقصائية "قياس مدى الرضا الأكاديمي لطلبة التمريض"

### المقابلة

ستشمل مشاركتك مقابلة فردية وجهًا لوجه أو عبر الفيديو حسب ما تفضل. وستركز أسئلة المقابلة على تجربتك التعليمية أثناء دراستك في برنامج التمريض والعوامل التي ساهمت في نجاحك في البرنامج أو أعاقته. وستكون مدة المقابلة لحوالي 30-60 دقيقة. سيتم تسجيل مقابلتك، وسيتم نشر نتائج الدراسة بدون ذكر اسماء أو أي معلومات تكشف عن هوية الفرد المشارك. ولن يتم مشاركة هذه المعلومات مع أي أحد أو الكشف عنها في أي وقت.

لن تكون هناك فائدة مباشرة لك من المشاركة في هذه الدراسة؛ ولكن هذه المعلومات التي نحصل عليها منك ستساهم في تحسين جودة برنامج التمريض ومساعدة أعضاء هيئة التدريس على تحسين عملية التخطيط لتعزيز نجاح الطلاب.

### المخاطر المحتملة

لا يوجد خطر متوقع أو مشقة مرتبطة بالمشاركة في هذه الدراسة.

### حقوق المشاركين في البحث

يرجى العلم بأن مشاركتك طوعية. ولديك الحق في تغيير رأيك أو الانسحاب من الدراسة في أي وقت، ويمكنك القيام بذلك دون أية عقوبة أو خسارة. يمكنك أيضاً رفض الإجابة عن أي سؤال لا تريد الإجابة عليه.

أشكركم على اهتمامكم.

إذا كان لديكم أي أسئلة حول هذه الدراسة يمكنكم الاتصال بريم العلوي في أي وقت.

رقم الهاتف: +986 99878881.

البريد الإلكتروني: [raaz85@mail.missouri.edu](mailto:raaz85@mail.missouri.edu)

قبل أن تقرر ما إذا كنت ستقبل دعوة المشاركة في هذه الدراسة ، الرجاء قراءة المعلومات المقدمة عن الدراسة وطلب أي توضيح أو إستفسار قد يتبادر إل ذهنك الآن وإذا كان لديك أي مخاوف أو إستفسارات لاحقاً بشأن المقابلة ، يمكنك الإتصال بالباحثة ريم العلوي.

إذا قرأت هذه المعلومات ووافقت على المشاركة في الدراسة، فيرجى التوقيع أدناه.



## Appendix E

### Permission to Use the UNSAS

9/23/2019

Mail - Al Alawi, Reem A. (MU-Student) - Outlook

**RE: Permission to Use the Undergraduate Nursing Student Academic Satisfaction Scale**

Susan Dennison <dennison@uwindsor.ca>

Thu 9/12/2019 9:15 AM

To: Al Alawi, Reem A. (MU-Student) <raaz85@mail.missouri.edu>

Hello Reem,

Thank you for this update and best of luck as you move forward with the research!

Susan Dennison



**Susan Dennison RN, MScN, CPPS**  
**Ancillary Academic Staff--Clinical Practice Learning Specialist**  
**Clinical Coordinator for Level 2 and 4 BScN Undergraduate Program**  
Faculty of Nursing 401 Sunset Ave. Windsor ON Canada N9B 3P4  
☎ 519 253 3000 Ext. 4390 ~ Fax 519 973-7084  
✉ [dennison@uwindsor.ca](mailto:dennison@uwindsor.ca)  
<http://www.uwindsor.ca/nursing>

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**From:** Al Alawi, Reem A. (MU-Student) <raaz85@mail.missouri.edu>

**Sent:** September 12, 2019 7:16 AM

**To:** Susan Dennison <dennison@uwindsor.ca>

**Subject:** Fw: Permission to Use the Undergraduate Nursing Student Academic Satisfaction Scale

Dear Dr. Dennison,

Thank you for granting me permission to use the Undergraduate Nursing Student Academic Satisfaction Scale. I would like to inform you that after discussing the scale with my academic advisor, I will be changing the verb tense of the survey statements from present tense to past tense because I will be administering the survey to nursing graduates.

As agreed, the survey will not be published as my own.

Best Wishes,

Reem Al-Alawi

Graduate Research Assistant

Office of Academic Affairs

University of Missouri System

309 University Hall

Columbia, MO 65211

[raaz85@mail.missouri.edu](mailto:raaz85@mail.missouri.edu)

<https://outlook.office.com/mail/inbox/id/AAQkAGFIYjk1YzNkLTBhNGMtNDUyOC04NDNDNmLTk0OGFhMDI5ZTYwMwAQABaXjgZnB3JFpZfK%2BVic7f...> 1/2

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**From:** Susan Dennison <[dennison@uwindsor.ca](mailto:dennison@uwindsor.ca)>  
**Sent:** Friday, August 30, 2019 11:01 AM  
**To:** Al Alawi, Reem A. (MU-Student) <[raaz85@mail.missouri.edu](mailto:raaz85@mail.missouri.edu)>; Maher El-Masri <[melmasri@uwindsor.ca](mailto:melmasri@uwindsor.ca)>  
**Subject:** RE: Permission to Use the Undergraduate Nursing Student Academic Satisfaction Scale

Hello Reem,  
This email confirms our permission to use the UNSASS scale in your research. Please note that if you decide to modify the scale (by altering or dropping items)--you may not publish a modified version of the scale as your own.  
Thank you and good luck with your research!  
Susan Dennison

---

**From:** Al Alawi, Reem A. (MU-Student) <[raaz85@mail.missouri.edu](mailto:raaz85@mail.missouri.edu)>  
**Sent:** August 29, 2019 2:46 PM  
**To:** Susan Dennison <[dennison@uwindsor.ca](mailto:dennison@uwindsor.ca)>; Maher El-Masri <[melmasri@uwindsor.ca](mailto:melmasri@uwindsor.ca)>  
**Subject:** Permission to Use the Undergraduate Nursing Student Academic Satisfaction Scale

Dear Dr. Dennison and Dr. El-Masri

Greetings,

My name is Reem Al Alawi, I am a doctoral candidate at the University of Missouri - Columbia. I am writing my dissertation on factors that contribute to nursing students' success in Oman and I am interested in using the Undergraduate Nursing Student Academic Satisfaction Scale (UNSASS) for my research project. I would like your permission to use the survey. I am also wondering if there are any terms or conditions to use the tool?

If you have no objection for me to utilize the tool as part of the dissertation, please indicate so by reply to this email.

Thank you in advance for your time,

Best wishes,

Reem Al Alawi

## **Vita**

Reem is an international student from Oman who began her nursing education with a diploma in nursing from Muscat Nursing Institute in 2002. She completed an RN-to-BSN bridging program at Villanova University in 2007. In 2012, Reem obtained a Master of Science of Nursing with emphasis on nursing education from the same university. She thereafter joined Oman Nursing Institute as an assistant tutor in 2012 and worked in the quality assurance department. Her work experience in the quality assurance department and her passion for research-related educational program evaluation was an inspiration for her dissertation work. Reem plans to return to her home country of Oman and continue her journey of educating and mentoring nursing students at Oman College of Health and Sciences.