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Factors influencing nursing students' continued success in a baccalaureate nursing program in Indonesia

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Abstract

Background: Holistic admission processes are needed to promote diversity in nursing students. Previous research had identified different variables related to the average grade point at the end of the first semester. There is a need to examine if those variables are associated with ongoing student success.

Objective: The purpose of this study was to analyze experience, attributes, and academic variables for an association with nursing student success. Student success was defined as being an active student at the end of the first year and at the end of the second year of a baccalaureate nursing program in Indonesia.

Methods: Binary logistic regression analysis was used to determine what relationship, if any, the variables had with student success, measured at the end of the first and second academic years. The data of 341 nursing students enrolled in August 2018 was analyzed.

Results: The variables accounted for 40.3% of the variance at the end of the first year and 24.3% of the variance at the end of the second year. There was a significant ($p < .05$) relationship between being enrolled at the end of the first year and 1) academic variables of first semester grade point average and the admission score of Raven's Advanced Progressive Matrices, and 2) attribute variables of reason for entering nursing and brief calling presence scale. A significant relationship was found between being enrolled at the end of the second year and the attribute variable of grit score. No variables had a strong correlation with other variables.

Conclusion: Holistic admission processes and promoting student success can create the future of the nursing workforce. Improving the diversity in admitted nursing students will enhance the diversity in the nursing workforce. To promote the success of all students, a variety of support interventions will need to be developed. As students' calling and grit may play a role in student success, a better understanding is needed. In addition, more research is needed to explore how developing calling and grit throughout the nursing program can impact student success.

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Keywords

baccalaureate nursing education; nursing students; holistic admission; Indonesia

Background

In nursing education, as well as other healthcare disciplines, there is an increasing movement for a holistic admission process to provide a more diverse healthcare workforce (Scott & Zerwic, 2015). In many communities, especially underserved communities, a diverse workforce in healthcare may assist in improving health (Glazer et al., 2016). In a holistic admission process, reasonable attention is given to evaluating various factors related to the potential students' experiences, attributes, and education to recruit a more diverse population of students (Association of American Medical Colleges, 2013). It is important that students admitted will be successful in the healthcare degree and graduate able to deliver safe quality patient care (Urban Universities for Health, 2014). Therefore, faculty will need to recognize resources available that will promote the success of the student (Glazer et al., 2016; Scott & Zerwic, 2015).

Identifying various student factors that may predict student success will assist in identifying necessary resources that are needed to holistically (i.e., academically and psychosocially) support the student. In previous studies of nursing students in the first year (Sommers & Wirawan, 2019), the study variables only accounted for less than 40% of the variance of the grade point average (GPA) at the end of the first semester of nursing students at a large, private, baccalaureate nursing program in Tangerang, Indonesia. The researchers recommended that further research studies are needed to identify relationships to

other variables of student success. One example of student success is academic success early, such as in the first and second years of the program (Al-Alawi et al., 2020).

The purpose of this study was to analyze experience, attributes, and academic variables for a relationship to nursing student success. Student success focused on early academic success and was defined as being an active student at the end of the first year and being an active student at the end of the second year of the baccalaureate nursing program. The experience factors were city of origin, previous healthcare experience, previous leadership roles, previous community service, and attending a pre-nursing course. The attribute factors were gender, reason for entering nursing, interview score, grit score, and calling score. The academic metric factors were GPA at the end of the first semester, admission test scores, type of high school, and study habits during the first semester.

Theoretical Framework

A holistic admission model, based on the Association of American Medical Colleges (2013), has been adapted for nursing by Scott and Zerwic (2015). Based on the model, an applicant to a nursing program should be reviewed based on experience factors (i.e., life, community, leadership, healthcare, and cultural/diversity experiences), attribute factors (i.e., demographic information, abilities, development, goals, and interests), and academic metrics (i.e., education experience, pre-admission test scores, grades, and standardized tests). The purpose of using a holistic admission model is to increase the diversity of the students being admitted.

A variation of the Scott and Zerwic (2015) model to review student success, as shown in **Figure 1**, was used in this study. As student success can include early academic success (Al-Alawi et al., 2020), in this study, it was defined as being able to continue in the nursing program and was measured as 1) being an active student at the end of the first year and 2) being an active student at the end of the second year.
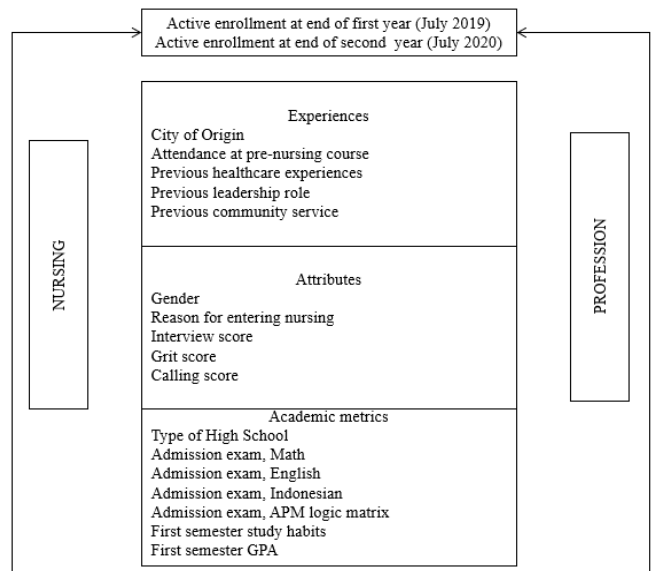

Figure 1 Holistic admission model, adapted for this study

The variables for this study were chosen based on previous research with nursing students. In previous research, the researchers found that the variables described only 28% - 37% of the variance in the GPA at the end of the first semester (Sommers & Park, 2017; Sommers & Wirawan, 2019). However, the variables that were significantly ($p < .05$) associated with the GPA at the end of the first semester were different in each of the research studies (see **Table 1**). The only variables that were consistently significant each year with the GPA at the end of the first semester were the scores on the admission exams in math, English, and Indonesian.

A description of each of the variables for this study is in **Table 2**. Several different variables were chosen because a combination of variables is a better predictor of student success (Al-Alawi et al., 2020).

Table 1 Variables associated with GPA at the end of nursing students' first semester, by cohort

Association with first semester GPA	Cohort admitted 2016	Cohort admitted 2017	Cohort admitted 2018
Experience variable			
Region/city of origin	Significant	Not significant	Significant
Attending pre-nursing course prior to the beginning of the nursing program	Not significant	Significant	Significant
Previous experience in healthcare, leadership, community service	Not studied	Not studied	Not significant
Attribute variable			
Age	Not significant	Not significant	Not studied
Gender	Significant	Not significant	Not significant
Interview	Not studied	Not studied	Not significant
Why I want to be a nurse	Not studied	Not studied	Not significant
Grit score	Not studied	Not studied	Not significant
Brief calling scale	Not studied	Not studied	Not significant
Academic variables			
Type of high school	Significant	Significant	Not significant
Math admission exam	Significant	Significant	Significant
English admission exam	Significant	Significant	Significant
Indonesian admission exam	Significant	Significant	Significant
Raven's advance progressive matrices	Significant	Significant	Not significant
First semester study habits	Not studied	Not studied	Not significant

Table 2 Definition of variables

Variable	Theoretical definition	Operational definition
Active enrollment as a nursing student at the end of the first academic year (July 2019) (dependent variable)	Early academic success by continuing in the nursing program as an active student at the end of the first academic year (July 2019)	Active enrollment as a nursing student at the end of the first academic year (July 2019). Active enrollment is being enrolled in the registrar online database on 31 July 2019 as an active student currently enrolled in courses: 0 = No 1= Yes
Active enrollment as a nursing student at the end of the second academic year (July 2020) (dependent variable)	Early academic success by continuing in the nursing program as an active student at the end of the second academic year (July 2020)	Active enrollment as a nursing student at the end of the first academic year (July 2020). Active enrollment is being enrolled in the registrar online database on 31 July 2020 as an active student currently enrolled in courses: 0 = No 1= Yes
Admission exam score for Math	An examination of basic math concepts that is used to assist in selecting students for admission.	The number of correctly answered questions on a timed math admission exam which was developed by experts in the university. Range is 0-30. The total of correctly answered questions as documented in the study data set.
Admission exam score for English	An examination of English reading ability and grammar that is used to assist in selecting students for admission.	The number of correctly answered questions on a timed English admission exam which was developed by experts in the university. Range is 0-50. The total of correctly answered questions as documented in the study data set.
Admission exam score for Indonesian	An examination of Indonesian reading and grammar that is used to assist in selecting students for admission.	The number of correctly answered questions on a timed Indonesian admission exam which was developed by experts in the university. Range is 0-40. The total of correctly answered questions as documented in the study data set.
Admission exam score for APM matrix	An examination of Raven's Advanced Progressive Matrices (APM) to assess logical reasoning as an indicator of general intelligence that is used to assist in selecting students for admission	The number of accurately identified patterns on the language-free and timed version of APM Raven's Advanced Progressive Matrices Range is 0-36. The total of correctly answered questions as documented in the study data set.
Region/city of origin	The region based on the city in Indonesia from which the student resided before coming to the university	The region, based on the city in Indonesia that was originally entered into the marketing database for each student and was recorded in the study data set. 1 = Sumatra island 2 = Java island 3 = Kalimantan island 4 = Sulawesi island 5 = Papua 6 = Maluku islands 7 = Bali and Nusa Tenggara islands
Type of high school	The category of the high school program the student attended in Indonesia	The type of high school program that the student reported to student services and as recorded in the study data set. 1 = Health/Science focused high school 2 = Social science focused high school 3 = Health/Science focused vocational school 4 = Social science focused vocational school
Gender	Societal constructed qualities of women and men	Male or female as indicated on the admission form as recorded in the study data set 0 = Female 1 = Male
Attendance at pre-nursing program	Attendance, by invitation only, to come to the university before the start of the first semester for concentrated instruction in life, computer, introductory English, and basic math skills	Attendance in the pre-nursing program as recorded in the study data set 0 = No 1 = Yes
Previous healthcare experience	Working in a hospital or clinic, caring for a family or friend in the home, prior to entering the university in August 2018	Previous healthcare experience before admission 0 = No 1 = Yes
Previous leadership role	Any type of leadership role prior to entering the university in August 2018	Previous leadership role before admission 0 = No 1 = Yes

Table 2 (Cont.)

Previous community service	Any type of service to the community prior to entering the university in August 2018	Previous community service before admission 0 = No 1 = Yes
Study habits	The majority of study time is spent studying alone or with others during the first semester. Studying in groups is a recommendation for learning and memory (Brown et al., 2014)	Most of study time is spent alone during the first semester 0 = No 1 = Yes
Rating of interview	Review of admission interviews of students admitted in August 2018	Interviews rating 0 = Meets standards 1 = Exceeds standards
Why I want to be a nurse	Review interview of students admitted in August 2018	The reason for wanting to be a nurse based on these categories (Mambu et al., 2019): 1 = To help or serve others or my family 2 = Because of a personal decision or calling 3 = Because of the influence of family, others, or circumstances 4 = Be a part of or improve the profession of nursing 5 = As a ministry and service to God 6 = Because of scholarship offering 7 = To be a blessing to others
Grit score	Perseverance and passion toward long-term goals (Duckworth, 2016; Duckworth et al., 2007)	The score obtained on the Indonesian version of the Grit Score. Range is 1-5
Calling score	A person's belief that they are called upon to do a particular kind of work (Dik et al., 2012)	The score obtained on the Indonesian version of the Brief Calling Scale. Range is 4-20

Methods

Study Design and Sample

This study used an exploratory study research method. The already developed study data set that contained the admission and academic records variables of nursing students that were admitted in August 2018 to a large, private, baccalaureate nursing program in Tangerang, Indonesia, was used. In August of 2018, there were 351 students enrolled; 341 students were still enrolled at the end of the first semester. For this study, two new variables regarding student success were added to the existing dataset, and all identifying data was removed. In addition, data from the ten students no longer enrolled at the end of the first semester was excluded.

In the development of that database, based on previous studies of nursing students (Sommers & Park, 2017; Sommers & Wirawan, 2019), nursing students in Cohort 2018 were asked about grit (12-item Grit Scale), calling (4-item Brief Calling Score), and study habits (researcher developed question). Grit was chosen because, in previous research, it has helped to predict success in military education and business (Duckworth, 2016). Among college students, those that view their future as a calling tend to be more confident and comfortable in their career choices (Dik et al., 2012). It was unknown if a sense of calling had any association with nursing students' GPA in the first semester. Studying in groups has been recommended for learning and long-term memory (Brown et al., 2014). It was unknown if studying with others had any association with nursing students' GPA in the first semester.

As the Grit Scale and Brief Calling Score had not been used in Indonesia previously, the items were translated into Indonesian and back translated to English by educators fluent in both Indonesian and English. The back translated English version was evaluated by a native English-speaking educator. For the original study with Cohort 2018, after ethical clearance was obtained for that study, a pilot study with 46 students to establish face validity and clarity. The students had no difficulties understanding the Indonesian version of the questions.

Data Analysis

Data analysis was done using SPSS 26, with a level of significance set at .05. To describe the characteristics of the data, descriptive statistical analysis was used. Means and standard deviations were reported for continuous variables, and frequency distributions and percentages were reported for categorical and dichotomous variables. Binary logistic regression analysis was completed to determine if there were any relationships between the experience, attribute, and academic variables and student success (as measured by the end of the first academic year and at the end of the second academic year) of nursing students admitted in August 2018. Before conducting the binary logistic regression analysis, the data was reviewed for uncommon values, outliers, and missing data. There was no missing data.

Ethical Consideration

Ethical approval for this study was from the Mochtar Riady Institute of Nanotechnology Ethics Committee, protocol number: 1912016-04. Upon receiving ethical approval, the existing database from the original study in 2018 (Ethical Approval number for the protocol of the original study was from Mochtar Riady Institute for Nanotechnology Ethics Committee: 04.1709180) was enhanced by adding two new variables: 1) active student at the end of the first academic year (July 2019) and 2) active student at the end of the second academic year (July 2020). The privacy of the students was preserved and protected as all data were de-identified in the database. Confidentiality of the de-identified database was maintained as it was only accessible on secure servers retrieved from password-protected computers.

Results

Description of Sample

As shown in **Table 3**, the majority of the participants were female (85.3%), from Sumatra Island (29.6%), and attended a Health/Science focused High School (80.6%). The majority did not attend the pre-nursing course (70.7%). Only a few of the participants exceeded the interview standards (28.7%). Most participants wanted to help or serve others or their families (67.4%) and had a previous leadership role (75.4%). Most of the students did not have previous healthcare experience (45.2%) or community service (57.8%) and studied with others (67.4%).

Table 3 Characteristics of the samples ($N = 341$)

Variable	Mean (SD)	n (%)
First semester GPA[†] (0.00-4.00)	3.18 (0.24)	
Admission exam scores (possible range)		
For Math (0-30)	12.55 (3.80)	
For English (0-50)	20.06 (6.30)	
For Indonesian (0-40)	24.84 (3.79)	
For APM[‡] (0-36)	19.59 (3.37)	
Grit score (1-5)	3.01 (0.36)	
Brief calling scale presence (1-5)	3.91 (0.89)	
Brief calling scale search (1-5)	4.19 (0.87)	
Region/city of origin		
Sumatra Island (reference group)		101 (29.6)
Java Island		73 (21.4)
Kalimantan Island		21 (6.2)
Sulawesi Island		52 (15.2)
Papua Island		22 (6.5)
Maluku Islands		24 (7.0)
Bali and Nusa Tenggara Islands		48 (14.1)
Attending the pre-nursing course		
No (reference group)		241 (70.7)
Yes		100 (29.3)
Gender		
Female (reference group)		291 (85.3)
Male		50 (14.7)
Type of high school		
Health/science high school (reference group)		275 (80.6)
Social science high school		21 (6.2)
Health/science vocational school		32 (9.4)
Social science vocational school		13 (3.8)
Interview		
Meets standard (reference group)		243 (71.3)
Exceeds standard		98 (28.7)
Why I want to be a nurse		
To help or serve others or my family (reference group)		230 (67.4)
Because of a personal decision or calling		18 (5.3)
Because of the influence of family, others, or circumstances		59 (17.3)
Be a part of or improve the profession of nursing		7 (2.1)
As a ministry and service to God		23 (6.7)
Because of scholarship offering		4 (1.2)
Previous healthcare experience		
No (reference group)		154 (45.2)
Yes		187 (54.8)
Previous leadership role		
No		84 (24.6)
Yes (reference group)		257 (75.4)
Previous community service		
No (reference group)		197 (57.8)
Yes		144 (42.2)
Study alone		
No (reference group)		230 (67.4)
Yes		111 (32.6)
Still enrolled July 2019		
No		17 (5.0)
Yes (reference group)		324 (95.0)
Still enrolled July 2020		
No		20 (5.9)
Yes (reference group)		321 (94.1)

[†]GPA = Grade Point Average [‡]APM = Raven's Advanced Progressive Matrices

Relationship of Variables with Student Success

Binary logistic regression was completed to examine the association, if any, of independent variables with being an active student at the end of the first academic year (July 2019). The independent variables were tested to verify that there was no violation of the assumption. The Hosmer-Lemeshow Test of the Goodness of fit was not significant ($p < .05$), indicating that the model is correctly specified.

Based on an examination of the beta coefficients, the variables of first semester GPA, APM logic matrix admission exam, reason for entering nursing, and brief calling presence scale were found to contribute to the model significantly ($p < .05$, see **Table 4**). Controlling for other variables, the variable of students' first semester GPA, in the logistic regression was found to contribute to the model. The unstandardized Beta weight for the variable first semester GPA; B = 6.594, SE = 1.882, Wald = 12.280, $p < .05$. The Estimated odd ratio favored an increase of nearly 730% [Exp (B) = 730.668, 95% CI (18.281, 29203.496)] for those still enrolled after the first year (July 2019) for one unit increase of first semester GPA.

Controlling for other variables, the variable of APM logic matrix admission exam, in the logistic regression was found to contribute to the model. The unstandardized Beta weight for

the variable of APM logic matrix admission exam, B = -.200, SE = .100, Wald = 3.981, $p < .05$. The Estimated odd ratio favored an increase of nearly 0.8% [Exp (B) = .819, 95% CI (.672, .996)] for those still enrolled after the first year (July 2019) for one unit increase of APM logic matrix admission exam score.

Controlling for other variables, the variable reason for entering nursing, in the logistic regression was found to contribute to the model. The unstandardized Beta weight for the variable reason for entering nursing; B = 1.231, SE = .610, Wald = 4.069, $p < .05$. The Estimated odd ratio favored an increase of nearly 34.2% [Exp (B) = 3.424, 95% CI (1.036, 11.320)] for those still enrolled after the first year (July 2019) for one unit increase of reason for entering nursing.

Finally, controlling for other variables, the variable brief calling presence scale, in the logistic regression was found to contribute to the model the unstandardized Beta weight for the variable brief calling presence scale; B = .782, SE = .397, Wald = 3.876, $p < .05$. The Estimated odd ratio favored an increase of nearly 21.8% [Exp (B) = 2.186, 95% CI (1.004, 4.762)] for those still enrolled after the first year (July 2019) for one unit increase of brief calling presence scale.

Table 4 Binary logic regression results for factors associated with being still enrolled at the end of the first year (July 2019)

Step 1	B	SE. B	Wald	df	Sig.	Exp(B)	95% CI for Exp(B) Lower	Upper
First semester grade point average (GPA)*	6.594	1.882	12.280	1	.000	730.668	18.281	29203.496
Attending pre-nursing course (Prenurse)	-.620	.720	.743	1	.389	.538	.131	2.204
Region/city of origin	-.175	.150	1.352	1	.245	.840	.625	1.127
Gender	-.513	.806	.404	1	.525	.599	.123	2.909
Type of high school	.303	.475	.407	1	.523	1.354	.534	3.431
Admission exam for English	-.010	.066	.025	1	.874	.990	.870	1.126
Admission exam for Math	-.093	.095	.963	1	.326	.911	.756	1.098
Admission exam for Indonesian	.091	.090	1.032	1	.310	1.095	.919	1.305
Admission exam for Raven's Advanced Progressive Matrices logic matrix (APM)*	-.200	.100	3.981	1	.046	.819	.672	.996
Interview	1.353	.905	2.235	1	.135	3.868	.657	22.781
Reason for entering nursing (WHY)*	1.231	.610	4.069	1	.044	3.424	1.036	11.320
Grit	.919	.909	1.021	1	.312	2.506	.422	14.899
Brief Calling Scale Presence (BCSP)*	.782	.397	3.876	1	.049	2.186	1.004	4.762
Brief Calling Scale Search (BCSS)	-.312	.387	.650	1	.420	.732	.343	1.563
Previous Healthcare Experience (PHE)	.155	.678	.052	1	.820	1.167	.309	4.411
Previous Leadership Role (PLR)	.220	.660	.111	1	.739	1.246	.342	4.547
Previous Community Service (PCS)	.054	.622	.007	1	.931	1.055	.312	3.571
Study Alone (SA)	.476	.666	.512	1	.474	1.610	.437	5.933
Constant*	-19.980	6.032	10.972	1	.001	.000		

* significant ($p < .05$)

Logistic model from the binary logistic analysis in this study is:

$$\ln\left(\frac{1(y_i Enrolled19|x_i)}{(1-\rho(y_i Enrolled19|x_i)}\right) = -19.980 + 6.594 GPA - .620 Prenurse - .175 City - .513 Gender + .303 TOHS - .10 English - .093 Math + .091 Indo - .200 APM + 1.353 Interview + 1.231 WHY + .919 GRIT + .782 BSCP - .312 BCSS + .155 PHE + .220 PLR + .054 PCS + .476 SA$$

The first semester GPA is the strongest factor that determines if the student will still be enrolled at the end of the first academic year (July 2019), followed by the two attribute factors of reason for entering nursing and brief calling presence scale and the one academic metrics factor of APM logic matrix admission exam. None of the experience factors were found to be significant in this study. The variables accounted for 40.3% of the variance of still be enrolled at the end of the first academic year (-2 Log likelihood = 86.83, Nagelkerke R Square = .403).

Binary logistic regression was also completed to examine the association, if any, of independent variables with being an active student at the end of the second academic year (July 2020). The independent variables were tested to verify that there was no violation of the assumption. The Hosmer-Lemeshow Test of the Goodness of fit was not significant ($p > .05$), indicating that the model is correctly specified.

Based on the analysis of the beta coefficients, only the variable of Grit was found to contribute to the model significantly ($p < .05$, see **Table 5**). The unstandardized Beta weight for the variable Grit: B = -3.470, SE = 1.575, Wald =

4.856, *p* <.05. The Estimated odd ratio favored an increase of nearly 3.1% [Exp (B) = .031, 95% CI (.001, .681)] for those still enrolled after the second year (July 2020) for one unit increase of Grit. The strongest factor that determined if the student was still enrolled at the end of the second year (July 2020) was the attribute factor of the Grit score. The other variables from experience factors and academic metric factors were not significant. The variables accounted for 31.0% of the variance of still be enrolled at the end of the first academic year (-2 Log likelihood = 42.365, Nagelkerke *R* Square = .310).

Table 5 Binary logic regression results for factors associated with being still enrolled at the end of the second year (July 2020)

Step 1	B	SE	Wald	df	Sig.	Exp(B)	95% CI for Exp(B) Lower	Upper
First semester grade point average (GPA)	3.831	2.442	2.461	1	.117	46.104	.385	5525.731
Attending pre-nursing course (Prenurse)	-.338	1.300	.068	1	.795	.713	.056	9.106
Region/City of origin	.542	.364	2.222	1	.136	1.719	.843	3.506
Gender	20.282	4160.378	.000	1	.996	643206061.982	.000	.
Type of High School	.393	.673	.341	1	.559	1.481	.396	5.537
Admission Exam for English	-.083	.086	.918	1	.338	.921	.778	1.090
Admission Exam for Math	.054	.140	.152	1	.697	1.056	.803	1.388
Admission exam for Indonesian	.105	.141	.561	1	.454	1.111	.843	1.464
Admission Exam for Raven's Advanced Progressive Matrices logic matrix (APM)[*]	.106	.155	.467	1	.495	1.111	.821	1.504
Interview	-.602	1.052	.328	1	.567	.548	.070	4.303
Reason for entering nursing (WHY)[*]	-.229	.377	.371	1	.542	.795	.380	1.663
Grit	-3.470	1.575	4.856	1	.028	.031	.001	.681
Brief Calling Scale Presence (BCSP)[*]	1.063	.655	2.631	1	.105	2.895	.801	10.456
Brief Calling Scale Search (BCSS)	-.539	.804	.449	1	.503	.583	.121	2.820
Previous Healthcare Experience (PHE)	-.926	1.219	.577	1	.447	.396	.036	4.317
Previous Leadership Role (PLR)	-18.130	3574.141	.000	1	.996	.000	.000	.
Previous Community Service (PCS)	.056	.992	.003	1	.955	1.057	.151	7.389
Study Alone (SA)	-.782	.931	.706	1	.401	.457	.074	2.837
Constant[*]	14.828	3574.149	.000	1	.997	2751412.900		

[*] significant (*p* < .05)

Logistic model from the binary logistic analysis in this study is:

$$\ln\left(\frac{1(y_i Enrolled20|x_i)}{(1-\rho(y_i Enrolled20|x_i)}\right) = 14.828 + 3.831GPA - .338Prenurse + .542City + 20.282\ Gender + .393TOHS - .083English + .054Math + .105Indo + .106APM - .602Interview - .229WHY - 3.470GRIT + 1.063BCSP - .539BCSS - .926PHE - 18.130PLR + .056PCS - .782SA$$

Discussion

This study examined if there was any association between a) experience factors (city of origin, previous healthcare experience, previous leadership roles, previous community service, and attending a pre-nursing course), b) attribute factors (gender, reason for entering nursing, interview score, grit score, and calling score), and c) academic metric factors (GPA at end of the first semester, admission test scores, type of high school, and study habits during the first semester) with being an active student at the end of the first academic year (July 2019) and with being an active student at the end of the second academic year (July 2020). These variables accounted for 40.3% of the variance for being enrolled at the end of the first year (July 2019) and 31.0% of the variance for being enrolled at the end of the second year (July 2020). These results are similar to previous research that examined variables and the GPA at the end of the first semester (Sommers & Park, 2017; Sommers & Wirawan, 2019).

None of the experience variables were significant for still being enrolled at the end of the first year or at the end of the second year. In previous research (Sommers & Wirawan, 2019), for some groups of nursing students, the experience variables of attendance at the pre-nursing course and region of origin had a significant relationship (*p* < .05) with the first semester GPA.

The attribute factors of "why I want to be a nurse" and brief calling score presence were associated with still being enrolled at the end of the first year. Most of the nursing students (67.4%) in this study wanted to be a nurse to help or serve others or families. A common reason for being a nurse is the opportunity to help others (Emerson, 2017; Mambu et al., 2019). A desire to help others is a defining attribute of calling (Emerson, 2017) and calling is a process that is developed over time (Dik et al., 2012).

The attribute factor of grit score was associated with still being enrolled at the end of the second year. In a research study with nurse leaders, grit was significantly related to an increased sense of personal accomplishment, decreased burnout, and increased longevity in leadership roles (Seguin, 2019). In a recent study with nursing students, grit scores increased as the students entered the second and third years (Terry & Peck, 2020). The researchers concluded that the second year of the program may be the time where grit is at its greatest development (Terry & Peck, 2020).

The academic metric factors of first semester GPA and admission exam APM logic matrix were associated with still being enrolled at the end of the first year. In previous studies, admission exams and GPA are frequently associated with predicting student success (Mthimunye & Daniels, 2019).

There are several limitations to this study. One is that the sample was taken from only one university and only one cohort. Another is a threat to internal validity that other factors throughout the first year and the second year may have influenced student success (i.e., relationships with other students, student support activities, tutoring, personal habits, etc.). It is unknown what influence the coronavirus-19 global pandemic had on students during their second year. As grit may be developed during the second year (Terry & Peck, 2020), it is unknown if the grit score of these students increased during the second year, especially with the global pandemic occurring four months before the end of their second academic year.

The global pandemic of the last two years has challenged nursing students and nurse educators. For many nursing students, the pandemic increased their desire to become nurses, for some, they wanted to withdraw from the program (Michel et al., 2021). In the "new normal", as the pandemic shifts to being endemic, challenges persist in nursing education, and educators will need to continue to be flexible in delivering nursing education and in supporting nursing students to be successful.

Implications of the Study
Answering the future challenge of nursing education, particularly in an endemic situation, evaluating the attributes of a nursing student applicant, especially calling and grit, as part of the admission process will be beneficial to the admission process. Applicants that have a sense of calling and grit may successfully complete a nursing program, even if they have lower admission exam scores, as part of holistic admission processes. The use of holistic admission processes also has implications for developing a diverse nursing workforce. To support diverse students that are admitted using a holistic admission process, a variety of support interventions to promote the success for all students is needed (Jeffreys, 2015). When teaching diverse nursing students, educators should consider personalizing approaches, utilizing available resources, promoting cultural diversity, and using a variety of activity teaching strategies (Sommers & Bonnel, 2020).

Conclusion

There were only four variables associated with still being enrolled at the end of the first year: First semester GPA, Admission Exam APM, reason for entering nursing, and brief call Score: Presence. Only one variable, Grit Score, was associated with still being enrolled at the end of the second year.

In this study, a higher GPA in the first semester was not associated with still being enrolled at the end of the second academic year. More research is needed to explore other factors that may contribute to nursing students being successful in a program, such as stress, self-efficacy, satisfaction, motivation (Jeffreys, 2015), clinical placement (Doyle et al., 2017), and influence of preceptors (Lasater,

2011). More research is also needed regarding what factors are associated with nursing students completing a program and being ready for nursing practice. It is recommended that this study is repeated with the end variables of completing a nursing program and/or passing a national nursing competency exam.

A better understanding of calling in nursing students may assist in the holistic admission process and in developing resources to promote student success and promote retention in the workforce (Emerson, 2017). A better understanding of how grit can be developed and taught throughout nursing programs is also needed. More research is needed to explore how developing calling and grit might influence holistic admission processes and influence student success in nursing programs. By considering attributes such as calling and grit as part of the admission process, more diverse students may be admitted into nursing programs. By developing teaching and learning support strategies to promote student success and develop grit, more diverse students may complete the nursing program and enter the nursing workforce.

Authors' Contributions

CLS: Primary Investigator; Proposal and final report; acquisition, analysis, and interpretation of data; Drafting and revising article; Final approval of article; Agree to be accountable for all aspects of work. GSH, RP, and IB: Proposal and final report; acquisition, analysis, and interpretation of data; Revising article; Final approval of article; Agree to be accountable for all aspects of work.

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Data Availability

The datasets generated during or analyzed during the current study are available from the corresponding author on reasonable request.

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