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Socio-demographic Characteristics and Academic Performance of the Master Students at the School of Public Health, National Institute of Public Health, Cambodia

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ABSTRACT

Introduction

The School of Public Health (SPH) of the National Institute of Public Health (NIPH) has invested efforts to enhance the quality of teaching and learning to produce more qualified human resources with adequate capacity to address public health challenges at the country and regional levels. To improve academic quality, there is also a demand for qualified enrolled candidates in these master's programs. Our study aimed to describe students' socio-demographics and determine factors associated with students' academic performance at the SPH.

Methods

The data were retrieved from the student database management system. In total, there were 370 students from five cohorts (2014 - 2018). We used descriptive analysis to describe the sociodemographic characteristics of the participants. Multivariate logistic regression was used to identify the independent factors associated with students' high academic performance.

Results

Approximately half of the students in each academic year completed the two-year master's courses. Of the 186 eligible students in the master's program, approximately 15% achieved high academic performance, and the other 50% were academically medium performers. Socio-demographic factors found to be significantly associated with high academic attainment include an admission year in 2015 (AOR = 4.7, 95% CI: 1.1 – 19.3), being an MSc. student in epidemiology (AOR = 13.2, 95% CI: 3.5 – 49.5) and a longer interval between an undergraduate degree and master's program enrollment (AOR = 0.2, 95% CI: 0.0 – 0.6).

Conclusion

The study highlighted specific cohort years and the epidemiology track as the main determinants of high academic performance. However, with a longer interval between undergraduates and the master's program, there was lower academic performance among students. Therefore, the SPH should consider services to help students improve their academic performance, particularly non-epidemiology track and non-recent undergraduates.

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Introduction

Since 2007, the School of Public Health of the National Institute of Public Health (SPH-NIPH) has had its mandate to provide higher education in the field of public health to build the future of public health professionals in Cambodia. To date, the school has offered five master's programs, including a Master of Public Health (MPH), a Master of Science (MSc) in Epidemiology, a Master of Science (MSc) in Nutrition, a Master of Hospital Administration (MHA), and a Master of Health and Community Development (MHCD). The two-year master's program generally starts from early November through late May (Semester 1 and Semester 3) and late May – November (Semester 2 and Semester 4) of the following year. The program has been approved by the Ministry of Health and the Ministry of Education, Youth, and Sport in Cambodia. To complete the master's program in SPH, all students are required to obtain at least 52 credits from course work, with a minimum cumulative GPA of 2.0 and no subject grade < C+ or no score < 60% in each subject) [1-3].

An alumni SPH-NIPH survey, which was conducted in 2016 among SPH-NIPH students admitted between 2007 and 2010 (Batch 1 to 4), found significant impacts of the master's degree program at the SPH-NIPH on the development of Cambodia's health system through the contribution of graduated students to various health disciplines in both the public and private sectors. The respondents asserted that the SPH-NIPH program enhanced their technical knowledge and strengthened their soft skills through a well-established curriculum, qualified faculty members, and a standardized thesis guideline, in addition to a supportive and enabling learning environment [4].

Intending to produce more qualified human resources with adequate capacity to address the public health challenges of the 21st century, the SPH-NIPH has invested efforts to enhance the quality of teaching and learning by equipping students with more rigorous academic skills as well as practical experiences. These efforts include but are not limited to the review and revision of the curriculum and course syllabus for each master's program, the provision of teaching pedagogy training to faculty members, and the regular conducting of semester course evaluations to appraise the quality of teaching and learning. In addition to the improvement in academic quality from the supply perspective, there is also an increased demand for qualified enrolled candidates in the program. In the past, practically, the selection of potential graduate students has relied on previously defined admission criteria such as the relevant academic background of the candidates, good academic records, preferably relevant experience, and good English proficiency [2].

Although there have been many studies that identified the factors associated with students' academic performance at the bachelor's degree level in the literature review [5-10], there have been limited studies exploring the determinants of the academic performance of students in master's degree programs [11]. A Nigerian study among postgraduate students reported age as the determinant of academic performance. However, no inferential statistics were undertaken in this study [11]. The study by Thiele, T et al. (2014) indicated that gender and ethnicity remained significantly associated with British undergraduate students' academic performance in multivariate regression [5]. Studies in Kuwait, Ghana, and Saudi Arabia found that students' academic achievement was significantly associated with age and sex [6-8]. In addition, high school grade point average (GPA) and high school majors also had a significant influence on students' academic performance in the Kuwait study [6]. Consistently, Lancia, L et al. (2018) found a significant association between the academic achievement of nursing students in Italy and some sociodemographic factors, such as gender, having higher upper-secondary diploma grades, and obtaining higher scores during admission tests [9]. A Saudi Arabian study revealed that being female, a nonsmoker, and a member of a charity association, higher scores in the psychological domain, higher scores in overall quality of life, and higher learning strategy scores were significantly associated with high students' GPA [10].

While a great deal of literature suggests that educational attainment has a relationship with some sociodemographic characteristics of students, no study or document review has been conducted to assess SPH-NIPH students' background characteristics and the association with their high academic performance. Our study therefore aimed to explore the sociodemographic characteristics of students and whether they influence their high academic performance. Understanding this will inform the Internal Quality Assurance (IQA) Unit to revise admission requirements and to better design the program to improve the student's academic performance and, thus, in the long term, produce competent public health professionals nationally and regionally.

Methods

A. Data source

The data were retrieved between January and June 2022 from the SPH's student database management system. Five cohorts of students from 2014 (Batch 8) to 2018 (Batch 12) were included: MPH, MSc. in Epidemiology, MSc. in Nutrition, and MHA. The observation period of the last cohort, Batch 12 (2018), was concluded in 2020. In total, there were 370 students, 186 of whom were eligible for inclusion in our analysis regardless of their cumulative GPA. One hundred eighty-four students were excluded due to the incompleteness of their required courses or dropout from the program.

B. Measurement of dependent and independent variables

The outcome variable is academic performance measured cumulatively by grade point average (GPA). The GPA is a standard grading system measured on a 4.0 scale. The GPA of an individual student is calculated by dividing a student's total grade points from all subjects over the study semesters by the number of total credit hours. When students receive a subject score of less than 60 and take the supplementary exam(s) or retake the course(s), the higher score they obtain is used to calculate GPA.

A low academic performance is defined as a performance with a cumulative GPA of less than 2.5, medium performance with a cumulative GPA of more than or equal to 2.5 but less than 3, and high performance with a cumulative GPA equal to or more than 3 (**Table 1**).

Table 1: Standard scores and grades in each subject course at SPH-NIPH [1-3]

Grade	Score (%)	Grade point
A	90-100%	4
B+	80-89%	3
B	70-79%	2
C+	60-69%	1
C	<60%	0

The independent variables were the year of admission, gender, age, bachelor's degree, number of years between the bachelor's degree and the master's program, type of job during enrollment, place of residence (Phnom Penh or province), study major, and source of tuition support.

C. Data management and analysis

The extracted data were incorporated into Microsoft Excel for processing and cleaning. The final data were imported and analyzed using STATA 14 (Stata Corp., College Station, TX). Descriptive analysis was used to describe the sociodemographic characteristics of the study participants and was presented in terms of frequency, mean, median, standard deviation, and range. A bivariate analysis using a chi-square test was used to determine the association between sociodemographic factors and students' academic performance at different levels (low, medium, and high performance). Then, multivariate logistic regression was used to identify the sociodemographic factors associated with high academic performance. A p value ≤ 0.05 was the criterion for statistical significance.

Results

A. Sociodemographic characteristics and academic performance of participants

Overall, the percentage of students achieving the required credits in the master's program in each academic year was approximately 50%. The trend varied slightly over the five years, with a remarkable drop to 43% in 2015 (**Figure 1**).

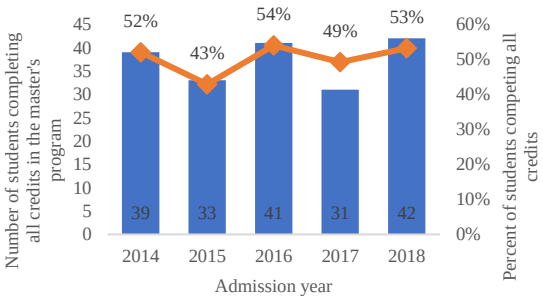

Figure 1: Trend of students completing all the required courses in the master's program at SPH-NIPH 2014-2018 (Batch 8-12)

Of 186 students who were eligible students in the master's program, 59% were male and 41% were female. Their average age was approximately 29.3 years old (median = 28 years), with a range of 22 to 49 years. Approximately a quarter of participants had a bachelor's degree in medical science or were medical doctors, while the other 28% held a bachelor's degree

in nursing or midwifery. Approximately 18% of participants had a background in pharmacy, and the remaining 27.4% had a bachelor's degree in laboratory science or another field. The average time between their undergraduate degree and admission to the master's program was 3.6 years (median = 2.0 years). Almost 40% of students were government staff, whereas approximately 25% of them were employees of nongovernmental organizations and private companies. Only 19 participants (10.2%) reported being unemployed or recently graduated university students. Approximately 73% of students were Phnom Penh residents, while the other 27% were from provinces. Among the four programs, MPH students accounted for 40.9%, followed by MHA (21%), MSc in Epidemiology (19.4%), and MSc in Nutrition (17.7%). Of all participants, only ten students (5.4%) received a scholarship or sponsorship for their tuition support.

The students′ average cumulative GPA is 2.6 (SD = 0.4) with a median of 2.7. Of 186 students, only 29 (15.6%) were academically high performers with a cumulative GPA ≥ 3.0. The other half had medium academic performance (**Table 2**).

B. Sociodemographic factors influencing the student's high academic performance

As indicated in Table 3, students admitted to the program in 2015 were more likely to have a higher academic performance compared to those admitted in other years (p value = 0.001). The academic performance among students who graduated with a bachelor's degree in pharmacy was significantly higher than that among students with other degrees (p value = 0.006); however, the sample in some cells was small. A significant proportion of students achieving higher academic performance was observed among students who had just graduated with their bachelor's degree compared to students who graduated three years or longer before being admitted to the master's program (p value = 0.046). Students majoring in an MSc. in Epidemiology, followed by an MSc. in nutrition appeared to have significantly higher academic performance than those in the other majors (p value < 0.001) (**Table 3**).

In multivariate logistic regression, the following factors were independently associated with high academic performance: admission year in 2015 (AOR = 5.9, 95% CI: 1.4 – 26.0) and being a student in the MSc. in Epidemiology (AOR = 12.2, 95% CI: 3.1 – 48.2). However, an interval of three years or longer before being admitted to the master's program was associated with low academic performance (AOR = 0.2, 95% CI: 0.0 – 0.5) (**Table 4**).

Discussion

Our study found that approximately half of the admitted students achieved the required credits in the master's program over five years. Among those who completed the master's courses, approximately 15% achieved high academic performance, and almost 50% were academic medium performers. This means that more work needs to be done to improve students' academic performance and increase the number of high academic achievers. This can be done by putting more attention on students who do well in school but are not the best.

It is noted that students admitted to the SPH-NIPH master's program in 2015 were 5.9 times more likely to have high academic performance compared to another cohort. This could be because students in that cohort were more committed, self-disciplined, and had a clearer sense of their goals, increasing the likelihood of completing a master's degree based on their observed academic performance. However, study commitment or motivation was not taken into account at the time of study admission.

Our findings indicated a negative association between high academic performance and the longer interval years between the bachelor's degree and the admission year in the school program. This could be used as a proxy measure of working experience. The longer students worked, the worse their academic performance was. This result might be explained by groups of full-time or unemployed participants; fresh undergraduates have adequate time to concentrate on their studies [12, 13]. Working students, in contrast, might have academic challenges with stress, a heavy workload, and poor time management [14, 15]. Unfortunately, no measures of the student's commitment, stress tolerance, or time management were available in our analysis.

Students in the MSc. in Epidemiology were more likely to have higher odds of having high academic performance in comparison to students in other master's programs. Two possible contextual explanations might be related to the academic backgrounds of students and the courses of the MSc. in Epidemiology program. Assessments in many MSc. courses were in fact more objective, and students were thus more likely to obtain higher scores in those subjects. However, more research should be done to explore this pattern.

Table 2: Sociodemographic characteristics of students who completed a two-year master's program, 2014-2018

Characteristics	Total (N = 186)	
	Freq.	%
Admission year		
2014	39	21.0
2015	33	17.7
2016	41	22.0
2017	31	16.7
2018	42	22.6
Gender		
Male	110	59.1
Female	76	40.9
Mean age in years (Median)	29.3 (28.0)	
Range	22 - 49	
Age group in years		
≤ 26	60	32.3
27-28	46	24.7
29-32	42	22.6
≥ 33	38	20.4
Undergraduate background		
Medical Doctor or Bachelor of Medical Sciences	49	26.3
Bachelor of Nursing or Midwife	52	28.0
Bachelor of Pharmacy	34	18.3
Bachelor of Laboratory or Others	51	27.4
Average years between the undergraduate degree and admission year at SPH-NIPH (Median)	3.6 (2.0)	
Range	0-19	
Interval between the undergraduate degree and admission year at SPH-NIPH		
<1	29	15.5
1- 2	66	35.5
≥ 3	91	49.0
Type of employment during enrolment		
Government	74	**39.8**
Non-governmental organization	45	24.2
Private job	47	25.3
Student or unemployed	19	10.2
Not reporting	1	0.5
Student's residence		
Phnom Penh	136	**73.1**
Province	50	26.9
Study major in a master's program		
Master of Public Health	76	**40.9**
Master of Science in Epidemiology	36	19.4
Master of Science in Nutrition	33	17.7
Master of Hospital Administration	41	**22.0**
Source of tuition support		
Self-funded	176	**94.6**
Scholarship or sponsorship	10	5.4
Mean of cumulative GPA (SD)	2.6 (0.4)	
Range	1.7-3.5	
Academic performance defined by cumulative GPA		
Low performance (CGPA < 2.5)	65	34.9
Medium performance (2.5 ≤ CGPA < 3)	92	49.5
High performance (CGPA ≥ 3)	29	**15.6**

CGPA: Cumulative Grade Point Average; SD: Standard Deviation

Table 3: Sociodemographic factors influencing academic performance in bivariate analysis

Socio-demographic factors	Academic performance						P value
	Low (n = 65)		Medium (n = 92)		High (n = 29)		
	Freq.	%	Freq.	%	Freq.	%	
Admission year							
2014	14	35.9	21	53.8	4	10.3	**0.001**
2015	6	18.2	17	51.5	10	**30.3**	
2016	24	58.5	13	31.7	4	9.8	
2017	14	45.2	12	38.7	5	16.1	
2018	7	16.7	29	69.0	6	14.3	
Gender							
Male	38	34.5	54	49.1	18	16.4	0.940
Female	27	35.5	38	50	11	14.5	
Age group in years							
≤ 26	18	30.0	30	50.0	12	20.0	0.310
27-28	15	32.6	25	54.4	6	13.0	
29-32	21	50.0	15	35.7	6	14.3	
≥ 33	11	28.9	22	57.9	5	13.2	
Undergraduate education							
Medical Doctor or Bachelor of Medical Sciences	4	13.3	23	76.7	3	10.0	**0.006**
Bachelor of Nursing or Midwife	29	55.8	16	30.8	7	13.5	
Bachelor of Pharmacy	**10**	**29.4**	**16**	**47.1**	**8**	**23.5**	
Bachelor of Laboratory or Others	14	27.5	28	54.9	9	17.7	
Interval between the undergraduate degree and admission year in SPH-NIPH							
Less than one	**9**	**31.0**	**12**	**41.4**	**8**	**27.6**	**0.046**
One- less than 3	22	33.3	29	43.9	15	22.7	
≥ 3	34	37.4	51	51.9	6	6.6	
Type of employment (n = 187)							
Government	34	45.9	31	41.9	9	12.2	0.091
Non-governmental organization	14	31.1	25	55.6	6	13.3	
Private job	13	27.7	26	55.3	8	17.0	
Student or unemployed	3	15.8	1	52.6	6	31.6	
Student's residence							
Phnom Penh	49	36.0	69	50.7	18	13.2	0.344
Province	16	32.0	23	46.0	11	22.0	
Study major							
Master of Public Health	28	36.8	41	53.9	7	9.2	**< 0.001**
Master of Science in Epidemiology	**4**	**11.1**	**17**	**47.2**	**15**	**41.7**	
Master of Science in Nutrition	**16**	**48.5**	**13**	**39.4**	**4**	**12.1**	
Master of Hospital Administration	17	41.5	21	51.2	3	7.3	
Source of tuition support							
Self-funded	60	34.1	89	50.6	27	15.3	0.443
Scholarship/sponsorship	5	50.0	3	30.0	2	20.0	

Unlike existing research [5-8], our study found no significant association between high academic performance and some demographic characteristics, such as gender, age, and educational background. The different study populations and variations of graduate programs may account for this discrepancy.

Limitations

This study has several limitations. Firstly, the sample directly took from only an SPH-NIPH database in which the results cannot be generalized to other universities. Our study included only students who completed the two-year master's courses. The findings should be interpreted with caution since they may not be representative of all applicants. Secondly, our study measured students' discrete academic performance based on the cumulative GPA instead of their academic performance trajectories. Thirdly, the analysis of existing data was limited by the inclusion of some potential covariates significantly associated with high academic performance in the literature, both the socio-demographic and behavioral variables included marital status [16, 17], socio-economic status [18], mental health status [19], sleep pattern [20], study habit [21, 22], time management [13, 15, 23], study commitment or motivation [8], ability to handle stress [14, 15], class attendance [24], and learning and teaching styles [25, 26]. In addition, while sponsorship was found in existing research to have a direct correlation with cumulative GPA [27], the variable measuring the source of tuition support in our analysis seemed to be non-differential and underreported since

Table 4: Socio-demographic factors associated with high academic performance in the multivariate logistic regression

Sociodemographic factors	High academic performance (n = 186)			
	OR	**95% CI**	**AOR**	**95% CI**
Admission year				
2014	Ref.	-	Ref.	-
2015	**3.8**	**1.1 - 13.6**	**5.9**	**1.4 - 26.0**
2016	0.9	0.2 - 4.1	1.2	0.2 - 6.0
2017	1.7	0.4 - 6.8	1.8	0.4 - 9.1
2018	1.5	0.4 - 5.6	1.6	0.4 - 7.0
Gender				
Male	Ref.	-	Ref.	-
Female	0.9	0.4-2.0	1.2	0.4 - 4.1
Age group in years				
≤ 26	Ref.	-	Ref.	-
27-28	0.6	0.2 - 1.7	1.3	0.4 - 4.3
29-32	0.7	0.2 - 1.9	1.3	0.4 - 4.7
≥ 33	0.6	0.2 - 1.10	1.8	0.5 - 7.1
Undergraduate background				
Medical Doctor or Bachelor of Medical Sciences	Ref.	-	Ref.	-
Bachelor of Nursing or Midwife	1.4	0.4 - 4.6	1.1	0.3 - 4.2
Bachelor of Pharmacy	2.7	0.8 - 9.2	4.1	1.1 - 15.5
Bachelor of Laboratory or Others	1.9	0.6 - 6.1	2.2	0.6 - 7.6
Interval years between the undergraduate degree and admission in SPH-NIPH				
Less than one	Ref.	-	Ref.	-
One- less than 3	0.8	0.3 - 2.1	0.7	0.3 - 2.0
≥ 3	**0.2**	**0.1 - 0.6**	**0.2**	**0.0 - 0.5**
Type of employment				
Government	Ref.	-	Ref.	-
Non-governmental organization	1.1	0.4 - 3.4	0.9	0.2 - 3.4
Private job	1.5	0.5 - 4.2	0.9	0.2 - 3.6
Student or unemployed	**3.3**	1.0 - 10.9	1.9	0.3 - 12.3
Student's residence				
Phnom Penh	Ref.	-	Ref.	-
Province	1.8	0.8 - 4.3	2.3	0.9 - 5.5
Study major				
Master of Public Health	Ref.	-	Ref.	-
Master of Science in Epidemiology	**7.0**	**2.5 - 19.6**	**12.2**	**3.1 - 48.2**
Master of Science in Nutrition	1.4	0.4 - 5.0	1.2	0.3 - 5.6
Master of Hospital Administration	0.8	0.2 - 3.2	1.0	0.2 - 5.5
Source of tuition support				
Self-funded or other sponsors	Ref.	-	Ref.	-
School scholarship	1.4	0.3 - 6.9	1.1	0.1 - 12.7

the data might not fully account for the other donor or organization sponsorships during the enrollment application.

Conclusion

Our findings showed that about half of the admitted students could retain and complete all the two-year courses required by the programs. It suggests that further research be conducted into the factors that contribute to underperformance and a low retention rate. Our study highlighted the main determinants of high academic performance as being related to specific cohort years, shorter interval years from the undergraduate degree, and the epidemiology track. The SPH management should consider services to help students improve their academic performance, particularly non-epidemiology track students and non-recent undergraduates. Further studies should be well designed to define the determinants of high academic performance by collecting the primary data with an adequate sample size and including all covariates that could potentially be associated with high academic performance among students.

Declarations

Ethics approval and consent

Ethical approval from the National Ethics Committee for Health Research (NECHR) Cambodia was exempted provided that this is a part of the progress work of SPH-NIPH internal quality assurance.

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Competing interest

The authors declare that they have no competing interests.

Authors' contribution

All authors took part in the development of the whole paper design. PS and SM collected and extracted the data, NC managed and performed the analysis. SM and NC prepared the first draft. HS provided feedback on the drafts and edited the manuscript. All authors read and approved the final manuscript.

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