Relationship between self-efficacy, perceived academic performance, and grade point average of nursing students during COVID-19

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Abstract-The coronavirus diseases (COVID-19) pandemic has changed the learning process of nursing students, including their theory, practicum, and practice. Meanwhile, an optimal result in the form of a grade point average (GPA) is obtained when students have the expected self-efficacy and academic perception. This study aims to determine the relationships and factors influencing self-efficacy, perceived academic performance, and GPA. This study used a cross-sectional design. A total of 300 active nursing students in East Java Province who participated through distant learning in the 2020/2021 academic year were selected by simple random sampling, while the data were collected using an online Google form questionnaire from July 8 to 30, 2021. Self-efficacy was measured using the Academic Self-Efficacy and Efficacy for Self-Regulated Learning questionnaire, perceived academic self-efficacy was measured using the Positive and Negative Affect Schedule (PANAS) questionnaire, and the GPA was filled in directly. Descriptive, confirmatory factor analysis, Spearman correlation, and Kruskal Wallis tests were used for analysis. The design research was conducted using a survey. Self-efficacy was moderately related to academic perception and weakly related to GPA. The influential factors included gender, current semester, academic year of entry, and level of nursing education. Therefore, self-efficacy is needed to complete education on time, whereas academic perception needs to be improved for practical learning.

Keywords - Self-efficacy, perceived academic, Grade Point Average (GPA), Nursing student, COVID-19

I. INTRODUCTION

The three learning activities of nursing higher education include theory, practicum, and practice[1]. The three learnings have different achievements and method characteristics. Theoretical learning is prioritized to increase knowledge, which can be achieved through lectures, seminars, discussions, or using good library sources. Practicum learning is an effort to train abilities and skills through demonstration and simulation methods using mannequins. Furthermore, practice learning is an effort to socialize the real lives of prospective nurses in hospitals, health centers, or the community by providing nursing care to clients.

Based on a letter from the Indonesian Ministry of Education and Culture for nursing students during the COVID-19 pandemic, learning from home is carried out online, along with assignments for theory learning. Practicum learning is conducted by way of assignments to create and upload audio videos about simulating nursing actions among friends. Practical learning uses case studies as a trigger for nursing care. Learning from home has been conducted since March 2020 [2].

Theoretical learning is conducted online. Meanwhile, practical learning is undertaken using real setting methods, such as hospitals on campus and practical learning in hospitals with the application of health protocols and periodic rapid antigen examinations. Practical learning began in May 2021. Student experiences regarding learning during the pandemic period include students who do not understand the lecturer's explanation online, never get direct feedback about actions taken during practicum, feel doubtful about their practicum abilities, are unable to communicate effectively, lack self-confidence, and feel stress that has no known cause.

Practical learning requires self-confidence and good academic perception of nursing students. Students' self-confidence can be observed in their self-efficacy. Self-efficacy is a key component of social cognitive theory that discusses human motivation to achieve expectations [3,4]. It is defined as a personal assessment of one's ability to organize and carry out actions to achieve specified goals [5]. Self-efficacy assessment is related to individual competence [6]. Perceived academic performance describes the personal internal attribution of achievement results and is a relatively stable psychological disposition [7]. Perceived academic performance comprises two parts: academic control and academic emotions. Academic control was found to be an important predictor of academic success in terms of (a) low dropout intentions and (b) high achievement. Control is often described as an individual's subjective perception; in other words, to be in control. Academic control is one's belief in one's academic success or failure. Academic emotions are related to

achievement activities, such as studying at a university and test results.

Practical learning for nursing students can provide real experiences and basic competency tests as nurses. The success of practical learning can be influenced by self-efficacy and perceived academic performance. Research related to self-efficacy and academic perception, especially for nursing students, has not been conducted, even though the pandemic period continues for an unknown end. The final result of learning carried out by nursing students every semester is always measured and expressed as an achievement and student success. Learning outcomes are called achievement indices.

Therefore, this study aims to describe the relationship and factors influencing the self-efficacy, perceived academic performance, and GPA of nursing students during the COVID-19 pandemic.

II. RESEARCH METHODS

This study was based on correlational research using a cross-sectional design. We used a cross-sectional correlational design to test the hypotheses. Correlational research is a research method in which the relationship between two or more variables is examined without any intervention. The results can be predicted based on the relationships obtained using this research method.

Research Question

The research questions were (1) What is the value of the validity and reliability of self-efficacy and perceived academic achievement of nursing?, (2) What is the relationship between self-efficacy, perceived academic, and GPA of nursing students?, (3) What are the factors to self-efficacy, perceived academic achievement, and GPA of nursing students?, and (4) Which is a good question item from the self-efficacy and the perceived academic achievement questionnaire for nursing students?

Sample

The participants were 300 nursing students in East Java Province, Indonesia, who participated in odd and even semesters of the 2020/2021 academic year. The participants' size was calculated using a 95% confidence interval, 5% margin of error with a population proportion of 50%, and the total number of students was 1000, which resulted in a minimum sample size of 278 and was selected by simple random sampling. Of the final 300 participants, 252 were women (84%) and 48 were men (16%), with a mean age of 20.7 (SD = 1.8). The lowest age of nursing students was 18 years, the highest was 35 years, and the average was 20.7 ± 1.8 years.

Inclusion Criteria

The inclusion criteria were as follows: (1) nursing students studying in a college or university, either state or private, in East Java Province; (2) currently enrolled in the academic year 2020-2021; (3) having access to internet connection; (4) learning from home; and (5) can provide informed consent.

Institution Review Board

Ethical eligibility was obtained from the Research Ethics Committee of the Health Polytechnic, Ministry of Health, Malang Number: 199 / KEPK-POLKESMA / 2021 on July 8, 2021.

Statistical Analysis

Descriptive analysis, Spearman correlation, Kruskal Wallis test, validity, and reliability were analyzed using Statistical Package for the Social Sciences (SPSS). Confirmatory factor analysis was performed using Lisrel 8.80. The significance level was set at 0.05.

A descriptive analysis was used to describe the frequency distribution of nursing student characteristics. Spearman correlation [12,13] and Kruskal-Wallis [14,15] analyses were performed for nonparametric data, and the data distribution was not statistically normal [16–18].The correlation coefficients between 0 and ± 0.30 show low, the coefficients between ± 0.31 and ± 0.70 indicate medium, and the coefficients between ± 0.71 and ± 1 point out high relationships [12,13,19]. Validity uses Pearson's correlation and reliability uses Cronbach's alpha [14]. The purpose of testing the validity and reliability was to ensure that the questionnaire used was suitable for measuring the expected data. Confirmatory factor analysis aims to confirm the indicators [20–22] used to measure self-efficacy and perceived academic achievement.

III. RESULTS

Sample Characteristics

From August to October 2021, a total 300 nursing students complete the protocol. The sample composition based on the year of entry, namely 2018/2019 as much as 44.0%, 2019/2020 as much as 24.7%, and 2020/2021 as much as 31.3%. The students characteristic based on the length of study in the second semester as much as 28.0%, the fourth semester as much as 22.7%, the sixth semester as much as 41.0%, and nursing profession 8.3%. While the characteristics of other students in Table 1.

Table 1 Nursing student sample characteristics (n=300)

Student Characteristics	f	%
Nursing education level:		
Third Diploma in Nursing	233	77.7
Bachelor of Nursing	42	14.0
Nursing Profession	25	8.3
Type of college:		
Polytechnics	202	67.3
High School	71	23.7
University	27	9.0
Nursing students' college status:		
Private	82	27.3
State	218	72.7
Nursing practice experience:		
Never before	182	60.7
Only in the hospital	69	23.0
At health centers and hospitals	49	16.3

Research Question Results

The results of the analysis according to the research questions are presented in Table 2, Table 3, Table 4, Figure 1, and Figure 2 below.

Table 2: Results of validity and reliability of self-efficacy and perceived academic achievement of nursing students in East Java Province.

No.	Variable / sub variable (question item)	Value					
		Min	Max	Average	SD	Validity	Alpha Cronbach
1	Self-efficacy (self-confidence in carrying out academic activities – 11 questions)	11	55	39.14	8.12	0.714 – 0.850	0.941 – 0.947
2	Self-efficacy (self-confidence to academic success – 8 questions)	20	56	43.13	6.61	0.755 – 0.843	0.881 – 0.892
3	Positive affect (10 questions)	15	50	31.49	5.39	0.307 – 0.687	0.666 – 0.694
4	Negative affect (10 questions)	10	50	28.27	5.88	0.295 – 0.693	0.701 – 0.762

Table 3: Spearman correlation value between self-efficacy, perceived academic, and GPA of nursing students in East Java Province.

No.	Variable / sub variable	Perceived Academic Achievement			GPA
		Positive Affect	Negative Affect	PANAS Category	
1	Self-confidence in carrying out academic activities				
	• p-value	0.000	0.459	0.025	0.000
	• Spearman correlation	0.389	0.043	0.129	0.210
2	Self-confidence to academic success				
	• p-value	0.000	0.704	0.008	0.014
	• Spearman correlation	0.335	0.022	0.152	0.141

Table 4: p value of Kruskal Wallis test of factors to self-efficacy, perceived academic achievement, and GPA of nursing students in East Java Province.

No	Factor	Variable (p value of Kruskal Wallis test)					
		GPA	Positive Affect	Negative Affect	PANAS Category	Carrying out academic activities	Academic success
1	Gender	0.208	0.002	0.128	0.520	0.964	0.889
2	Current semester	0.014	0.631	0.010	0.565	0.267	0.014
3	Year of entry	0.003	0.087	0.085	0.188	0.905	0.103
4	College status	0.528	0.553	0.743	0.993	0.465	0.091
5	Type of college	0.387	0.332	0.152	0.405	0.949	0.228
6	Nursing Education Level	0.310	0.727	0.122	0.424	0.200	0.001

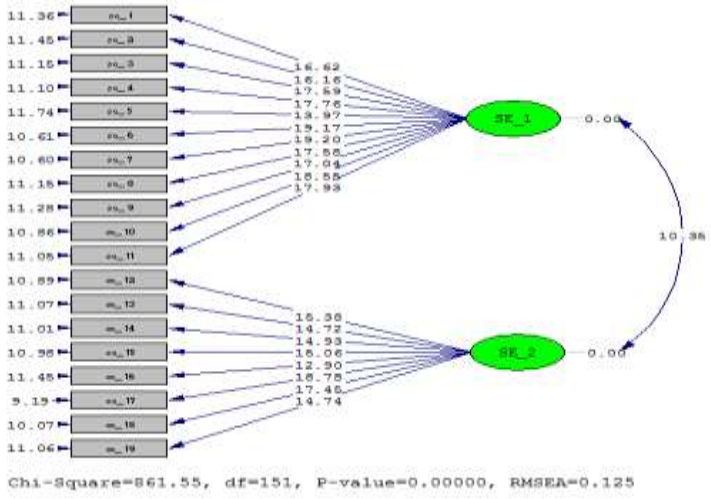

Figure 1: The t value of the confirmatory factor analysis of the question items of the self-efficacy questionnaire for nursing students in East Java Province.

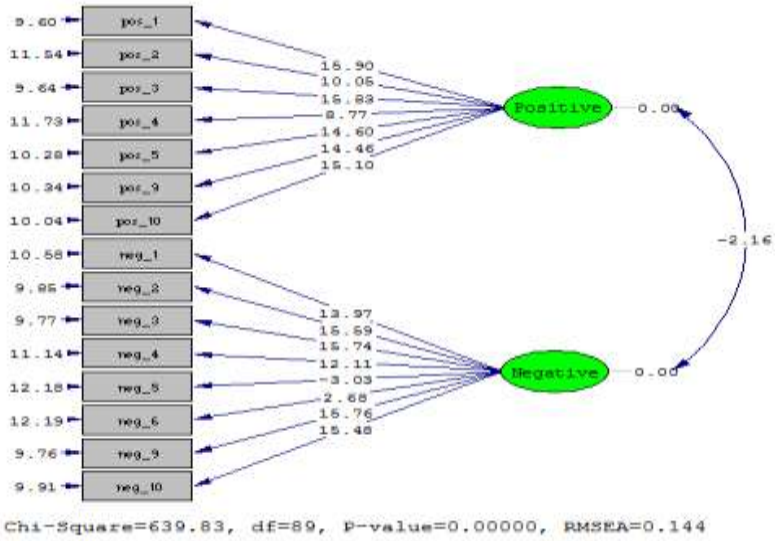

Figure 2: The t-value of confirmatory factor analysis (third) of the question items of the perceived academic achievement questionnaire for nursing students in East Java Province.

IV. Discussion

Characteristics of Nursing Students during the COVID-19 Pandemic

The nursing students used as respondents fulfill Law Number 38 of 2014, which states that a nurse is an individual with an educational qualification that is recognized in Indonesia, namely Vocational and Professional. Vocational nurses acquire skills from Diploma III Nursing education, while professional nurses are experts and obtain Bachelor of Nursing and Nursing Profession. The results are represented by the level of nursing education (Table 1).

The number of Third Diploma of Nursing students was 77.7%, Bachelor of Nursing 14.0%, and 8.3% Nursing Profession. This comparison illustrates that the nursing education in this province has developed from Third Diploma since 1985 to Bachelor and Nursing Profession in 2005. Currently, there are more than 100 institutions that manage nursing programs between the vocational and professional levels in East Java Province.

There are a total of five government-owned (state) nursing institutions in East Java Province, including polytechnics and universities, while Foundation (private) also includes colleges and universities. These institutions manage nursing education at the vocational and professional levels. Meanwhile, the number of students used as respondents based on ownership between the public and private sectors was 72.7% and 27.3%, respectively. Furthermore, based on the type of institution, namely polytechnic, college, and university, the numbers were 67.35%, 23.7%, and 9.0%, respectively (Table 1).

Nursing is a profession carried out by nurses and originates from the word "nurture" meaning to care, protect, or treat like a growing child, similar to motherhood [23,24]. The similarity of attitudes is shown by the sex ratio of the female and male namely 84.0% and 16.0% (Table 1). Female nurses are more in demand compared to males due to their innate instinct to protect and meet the needs of people.

The age of nursing students in East Java Province ranges from 18-35 years with an average of 20.69 ± 1.89 years. The lowest age illustrates that the respondents in this study were currently in semester 2 of the 2020/2021 academic year (Table 1), while the highest age shows that a nursing student has the right to a lifelong education according to the 1945 Constitution and guaranteed rights as in Law Number 20 of 2003 concerning the National Education System.

The respondents also consist of students from different academic years of entry from 2018/2019 to 2020/2021 (Table 1). Based on the results, a full academic year, namely 2020/2021 was carried out from home, while students that were not in the second semester carried out at least one practical activity before the COVID-19 pandemic.

A total of 39.3% students had practiced in real health care settings (Table 1), while others at the nursing profession level continued practicing even during the pandemic. Practical learning aims to adapt nurses to provide real-life care and is not replaceable by other forms of learning, especially online learning. However, practical experience during the pandemic is perceived as scary and creates anxiety due to the lack of skills to apply for patients, which potentially leads to the infection of a nurse and the family. Efforts to reduce negative practical experiences include maintaining discipline and complying with practice rules, personal training at home using online learning resources, increasing self-awareness when in contact with patients, and adhering to established health protocols.

The questionnaire used for self-efficacy data was the Academic Self-Efficacy and Efficacy for Self-Regulated Learning adapted from [5,8],while the perceived academic achievement used PANAS, which is the recommended method for measuring academic [4,9–11]. The data collected were then tested for validity and reliability using product moment correlation and Cronbach's alpha (α), respectively, with licensed SPSS version 24.

The validity of each question item had a probability value of less than the alpha test set at 0.05 (Table 2); therefore, the question item is valid for use. Furthermore, the reliability of each question item had a minimum value of 0.666 (Table 2). Statistically, the reliability is acceptable when the value is up to at least 0.70 [25–27].

Self-Efficacy of Nursing Students during the COVID-19 Pandemic

Self-efficacy is needed to improve performance, especially in practical learning processes aimed at adapting nurses to real-life situations. It comprises self-confidence in carrying out learning and academic success with an average value and standard deviation of 39.14 ± 8.12 and 43.13 ± 6.61, respectively (Table 2). Furthermore, self-confidence determines nursing students' ability to learn from home, whereas academic success is presented as GPA. Self-efficacy influences human behavior, especially nursing students, through four psychological processes [28]: (1) cognition reflected in personal goals and intensity to achieve; (2) motivation related to goal setting, effort, persistence, and resistance to failure; (3) affective processes related to self-regulation; and (4) a selection process that supports the achievement of objectives. Bandura explained that the main sources of self-efficacy are experiences of success and failure, exemplified by social models and persuasion, as well as physiological responses (somatic and emotional status)[3,28]. Empirically, self-efficacy influences nursing students' academic motivation to decide on appropriate activities, level of effort, persistence, and emotional reactions [5]. It is a direct response to self-change and imitation of a model owing to persuasion and physiological responses. In addition, self-efficacy is an indicator of individual change [29].

Furthermore, self-efficacy is needed, particularly during the COVID-19 pandemic, which requires nursing students to study from home [2]. It is acquired by actively seeking information through credible learning sources, simulating nursing actions at home with audio-video guidance from tutors, and increasing learning independence. However, some students felt less confident when they were required to practice directly.

The self-efficacy questionnaire to measure self-confidence in learning and academic success had a minimum validity value of

0.714 and a reliability of 0.881. Furthermore, the questionnaire for the category of self-confidence in learning and academic success had reliabilities of 0.947 and 0.902, respectively (Table 2). The confirmatory factor analysis result of the self-efficacy questionnaire had a licensed value of Lisrel 8.80 (Figure 1), while the t-value exceeded the set value of 1.96. Statistically, this shows that all the question items in the self-efficacy questionnaire are consistent and therefore applicable for measuring the self-efficacy of nursing students.

Perceived academic control of Nursing Students during the COVID-19 Pandemic

Perceived academic control aims to measure the positive and negative affect of nursing students using the PANAS questionnaire as an academic emotion [9–11,29]. The positive and negative affects had an average value and standard deviation of 31.59 ± 5.39 and 28.27 ± 5.88 respectively (Table 2). Furthermore, the values of positive and negative affects were compared. If the positive affect value is greater than the negative affect value, then the nursing student is placed in the positive affect category. In contrast, when the positive affect value was less than the negative affect value, the student was placed in the negative affect category. Based on the results, 89.0% nursing students had positive affect, while 11.0% had negative affect (Table 1).

Perceived academics, also called academic control, are a continuum that distinguishes between two groups of students with low and high control. Students with low control are prone to failure and are less oriented, whereas others with high control are academically successful and mastery oriented. Furthermore, students with low control have different academic trajectories in terms of cognition, emotion, motivation, and achievement [30]. These conditions describe the types of university student.

Academic control plays two important roles [30] in nursing learning. First, it affects achievement motivation, such as in the early days of university students. Second, it affects academic results. These two roles are not only for students, but also for tutors to determine the learning methods used for students with high and low perceived academics. For example, the discussion learning method might be suitable for students with high perceived academic performance as it provides autonomy for thinking, or the lecture learning method may be suitable for students with low perceived academic performance because it is structured and predictable.

Positive and negative affects are important emotions in nursing students' learning. The Journal of Medical Education states that emotions are always present in academic and clinical settings [31]. Furthermore, nursing students' emotions of hope, worry, and relief tend to affect their motivation, preparation, and learning strategies. A previous study stated that emotions are completely measured using positive and negative affect [30,32], because affect is an emotional segment of attitudes [33].

Positive and negative emotions determine the success of nursing students in theoretical and practical learning. In general, positive emotions exert an adaptive effect on learning and achievement, whereas negative emotions tend to have a non-adaptive effect. Besides, learning theory, practicum, and practice produce achievement emotions [31]. Achievement emotions can affect cognitive, motivational, and learning strategies as well as overall performance.

The PANAS questionnaire consisted of positive affect on odd-numbered items and negative affect on even-numbered items; hence, each affect had 10 questions. Based on the results, the lowest validity and reliability were 0.325 and 0.666, respectively (Table 2), and were categorized as weak. Furthermore, the confirmatory factor analysis of the question items as positive and negative affect indicators had a t-value greater than 1.96. In addition, a third confirmatory factor analysis (Figure 2) was performed and a t-value greater than the specified value was obtained. Therefore, only question items with a t-value greater than 1.96 are used to measure positive (7 items) and negative (8 items) affect for nursing students in Indonesia.

Grade Point Average (GPA) of Nursing Students during the COVID-19 Pandemic

The academic success of nursing students is indicated by the semester grade point average (GPA) with an average and standard deviation of 3.55 ± 0.21 (Table 1). The odd semester GPA for the 2020/2021 academic year was used, with the consideration that theoretical and practical learning for all nursing students was carried out from home (online). Nursing Profession students carried out practical learning activities in the healthcare setting according to the health protocols and evaluation of infection using antigen swabs regularly.

The GPA was, as expected, greater than 3.00 for academic programs and more than 3.50 for professional programs [34] on a scale of 1.00 – 4.00. Meanwhile, self-regulation, as one of the adaptive functions of emotions [35], produces an achievement index. Self-regulation is a goal-directed, dynamic, and interactive process that indicates the completion of nursing students' learning tasks. Furthermore, the suitability between personal goals and completed tasks generates positive emotions that determine learning achievements. When inadequate, it produces negative emotions that help nursing students avoid tasks to maintain their self-image [35]. Practical learning for nursing students during COVID-19 has produced various perceptions, including less practical experience and practice time, few nursing actions taken, as well as increased stress and awareness. This is because hospitals, as a practical place for nursing students, are used to serve COVID-19 patients; therefore, the capacity to treat non-COVID-19 patients is reduced [36]. As the GPA has been achieved, students are expected to be allowed to practice nursing in hospitals with strict health protocols during the pandemic.

The Relationship between Self-Efficacy and Perceived Academic Achievement and Grade Point Average of Nursing Students during the COVID-19 Pandemic

A significant relationship was found between self-efficacy, perceived academics, positive affect, and GPA, but not in negative affect (Table 3). The significant Spearman correlation value was 0.141 – 0.389, which is statistically weak [12,13,19]. Self-efficacy predicts a reliable life outcome [37], and is an important attribute needed in nursing to provide care for patients. Research

on university students has revealed that self-efficacy is strongly related to academic perception [38,39].

Caprara, Steca, Gerbino, Paciello, and Vecchio in 2006 showed th at self-efficacy with positive emotions strongly contributes to satisfaction and self-esteem, while Bandura, Barbaranelli, Caprara, and Pastorelli in 1996 found that self-efficacy had a positive effect on academic achievement. Furthermore, Caprara, Vecchione, Barbaranelli, and Alessandri in 2013 showed that emotional stability increases with age and increases self-efficacy in managing negative emotions [37]. Confidence also positively influences academic performance indirectly through motivation[40].

Self-efficacy plays a role in expressing positive emotions, such as joy and happiness, or negative emotions, such as sadness or anger, when interacting with others. In addition, it expresses individual traits and facilitates social relationships [37]. Meanwhile, the GPA is a result of motivation based on the theory of achievement motivation and emotion by Weiner (1985, 1995). This theory states that a student who attributes a series of failures to a lack of effort has a better prognosis academically than others who associate failure with a lack of ability [30]. Self-efficacy can significantly predict GPA [38].

A previous study on the relationship between self-efficacy, affect, and GPA reported that anxiety is negatively related to GPA, whereas GPA is related to positive affect [35]. However, the development of academic emotions has implications for self-efficacy and GPA [35]. This is in line with the results obtained in this study, which showed that self-efficacy is related to positive affect and GPA (Table 3), although the relationship is weak. In addition, self-efficacy is related to affect, which has been categorized based on dominant values.

Factors Influencing Self-Efficacy, Perceived Academic Achievement, and Grade Point Average of Nursing Students during the COVID-19 Pandemic

The results of the normality test using χ^2 revealed that the probability value of each factor variable was less than the set value of 0.05 (Table 1); hence, the data distribution was declared abnormal, and a nonparametric test was needed for further analysis [41,42]. Nonparametric analysis assesses the influencing factors using the Kruskal–Wallis test to compare the influence of a group [43].

Gender does not influence GPA and self-efficacy but influences the affect or emotion. The GPA is the result of knowledge processing through thinking and is part of the right of every student, while self-efficacy is the belief in self-control by thinking, motivating, and behaving[4]. This study identifies self-efficacy as an individual's belief to succeed in attending nursing education programs. The self-efficacy of nursing students is strongly influenced by their motivation during the beginning of the academic year. Male students have a higher growth rate of self-efficacy in managing negative emotions than female students, but this is not significantly related to emotional stability and self-efficacy [40].

Gender influences affection or emotions. Meanwhile, nursing practice learning requires affect or emotion to understand a patient's needs. The nursing practice aims to provide care to patients through physical and emotional stimulation; hence, male and female students need to adjust emotionally [44]. A study conducted in Yogyakarta highlighted that female students have higher and better emotional regulation abilities than male students [45]. Moreover, emotional management is an important element in controlling student behavior. This condition explains the larger proportion of female nurses compared to male nurses.

The current semester is another factor affecting self-efficacy, perception control, and GPA (Table 4). The study time indicated in the current semester increases self-confidence and emotional control based on the thinking ability of students after learning about psychology, mental nursing, management, and the practice of fulfilling basic human needs to increase the maturity of nursing students[1].

Nursing students who implement practical learning based on the theory of basic human needs according to Abraham Maslow (1970) tend to have a sense of belonging and self-esteem. The need for belongingness as a prospective nurse arises after realizing that others need nursing, while self-esteem is obtained from the appreciation of patients and families when receiving care during practical learning. Therefore, these two attributes increase the self-efficacy and emotions of nursing students.

The length of study affects GPA; the longer the semester, the more complex the learning process, which requires cognitive, behavioral, and action skills integrated into practical learning. Additionally, the complexity of skills in practical learning allows tutors to evaluate and assess nursing students with various components of success; hence, the best assessment is provided. The GPA of students (Table 1) fulfilled the minimum standard for diploma and bachelor degree of 2.76 and Profession of 3.00, respectively [34]. The length of study is also determined by the level of education obtained and increases emotions that affect self-efficacy, especially self-confidence.

The educational level has no effect on perception control and GPA but affects self-efficacy (Table 4). The concepts of basic human needs, psychology, and mental nursing courses studied at all levels of nursing education increase maturity; therefore, nurses are able to control their emotions[1]. Furthermore, emotions affect thoughts and behavior[46], as demonstrated by the GPA. Assessment standards for nursing students at various levels of education have been established using generally accepted standards [34].

V. CONCLUSSION

Self-efficacy regarding self-confidence in carrying out learning activities and academic success were moderately related to perceived academics, especially in students with positive affect, and weakly related to the GPA value of nursing students during the COVID-19 pandemic. Factors influencing self-efficacy, perceived academics, and GPA of nursing students during COVID-19 included gender, current semester, academic year of entry, and level of nursing education.

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