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Variation in Motivation and Learning Strategies in a Cohort Study of Medical Students at the Andrés Bello University, Viña Del Mar Campus, Chile. 2 Years of Follow-Up

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A B S T R A C T

In Chile there is an evident concern for the improvement of the quality of education, and therefore of learning itself, and it is due to this, that knowing the pillars of the latter, motivation and learning strategies, becomes fundamental to achieve the objective. There is scarce information that relates the variables motivation and learning strategies in medical students. The objective of this research is to identify the variation of motivation and learning strategies in medical students. For this purpose, an analytical-observational study was carried out, a prospective cohort study of two years of follow-up, during the first and second year of the medical career of the Universidad Andrés Bello, Viña del Mar. There was a sample of 33 individuals, of which 20 were female and 13 male. The results showed significant variations in motivation, decreasing in the 2nd year, compared to the 1st, the same results were observed, in particular, for the female sex. On the other hand, significant variations were also observed in learning strategies, with a decrease in resource management in the second year compared to the first year; these results were repeated for both sexes. Finally, the results showed that there is a positive correlation between motivation and learning strategies in the second year.

Keywords: Motivation, strategies, learning, medicine, MSLQ

1. Introduction

Currently, there is an evident concern for improving the quality of education and its response to the demands of the productive sector, which results in a review of how students learn and the educational models that are currently being applied (1; 2).

Students entering the university environment must change their perspective and mature with respect to the knowledge they wish to acquire, beginning to forge their own path in the knowledge of facts, in order to become a person who collaborates proactively in society (9). To this end, those who wish to learn must know their intellectual capacities and develop strategies that allow them to satisfy this need. Within the learning process, it is essential to take into consideration two pillars to carry out this task: motivation and learning strategies. These concepts define the degree of knowledge acquired by the student, which is also reflected in the academic performance they will obtain (3).

Regarding motivation, Míguez forcefully states that motivated students learn faster and more effectively than students who are not motivated (4). Similarly, the author points out that having clear and positive expectations makes the tasks and activities to be undertaken more rewarding. Regarding learning strategies, these are defined as the actions and thoughts of students that occur during the learning process and that have a great influence on the degree of motivation and include aspects such as acquisition, retention and transfer (5).

However, to date, the scarce research that has been conducted on the topics and processes involved in learning has been in the context of the elementary and middle school population, and not at a higher level, so there are no conclusive data that relate the variables motivation and learning strategies in medical students (1; 2).

Based on the above, the main objective of this study is to identify the variation of motivation and learning strategies in a cohort study of two years of follow-up, between the first and second year in medical students at the Universidad Andrés Bello, Viña del Mar. It also aims to determine the variation in intrinsic and extrinsic motivation, as well as in learning strategies, and finally, to analyze the results obtained in both categories, according to sex.

2. Bibliographic Review

At the beginning of the research process, we first resorted to the virtual library of our university in order to obtain the most relevant background information on the subject, starting with the learning descriptor, narrowing it down more and more, through advanced search using strategies and selecting the appropriate publication date range. At the beginning, there were multiple previous research works that the platform provided us with, so an even greater narrowing was performed using the medicine descriptor, managing to gather a much more adequate amount of information to our requirements. The same procedure was carried out with the motivation descriptors, always in the area of medical education. Finally, and due to the methodological design we decided to use in this research, it was necessary to obtain background information on the cohort study, so we proceeded to search with the descriptor "cohort study".

It is important to recognize, that according to studies conducted by Mayta-Tristán and Col in 2015, it is proposed that there are two main motivators that drive the medical student to choose a career in the area of science and health, these are the philanthropic dimension of helping others and the motives that are related to the acquisition of a privileged social and economic position (5). According to a research conducted by the University of Medical Sciences of Matanzas, Cuba, at least 50% of first year medical students always wanted to study medicine, 61% wanted other professions, such as artists, lawyers, engineers, among others. In addition to this work, the question "Do you enjoy studying the subjects of the career? 87% of those surveyed enjoy the subjects, none of them are indifferent to them and the remaining 13% do not enjoy them, find them stressful or do not know what to say (6). These figures show that despite the fact that most of the students are not convinced of choosing the career of Medicine, they do show adherence to its subjects, so there must be some factor that urges them to attend classes and have the need to learn.

We are aware that one of the most relevant factors when making a decision such as entering a university career is based on the vocation to perform the task to which the subject developed for 5-7 years. According to the study carried out by the Faculty of Medicine of the Autonomous University of San Luis Potosi, Mexico, some risk factors for the desertion of medical students are proposed, such as, the institution, school or college from which the students come and the preparation that these deliver in knowledge influences the undergraduate development of the student. To this is added the factor "tolerance to frustration" in students of initial courses, being more frequent the desertion in students who fail in ordinary solemn exams and must take extraordinary exams to pass the subject. This last factor includes the fact that once students have passed at least the first two years of the course, discipline and study habits should already be consolidated, which leads to less school failure and therefore less desertion from medical school (7).

One of the bases of learning is motivation, which, according to Morales-Cadena (8), must maintain harmony between teacher, student and educational institution. He mentions that a teacher who shows passion for knowledge and learning will transmit to his students a goal-oriented perception. Motivation can be divided in two, intrinsic and extrinsic, each of them influences learning in a different way. Extrinsic motivation is defined as the fact of doing the activities for something other than one's own interest, such as some reward, or that the teacher does the subject in a way that is fun for the student (9). Based on the above, this concept is based on two fundamental pillars, punishment and reward, so that human behavior is influenced and guided towards one of the two types of consequences. Focusing on the student context, a reward is considered as an attractive "environmental" object that is given a sequence of behavior and increases the likelihood that this behavior is given again, this is mainly associated with the stimulus of getting good grades, being rewarded for a good comment from the teacher, being recognized by the school in which you participate, among others. Punishment, on the other hand, is defined as a non-attractive "environmental" object that occurs after a sequence of behavior and reduces the probability that this behavior will occur again (10), this type of event can be observed in obtaining poor grades, repeating a course or simply not obtaining the expected benefits for those who are recognized by their school, among other examples. When extrinsic motivation is insufficient for the subject, he tends to resort to intrinsic motivation, which is defined as the performance of an activity not for external rewards, but for the direct enjoyment of an activity in itself (9). If this "enjoyment" is taken to the academic context, it seeks to satisfy the needs of self-determination, that is, to use the resources learned and delivered by the school/teacher to organize the student's life and create the future he/she desires. In addition, it must understand the effectiveness of the facts, i.e., to acquire knowledge to achieve "good academic results". Finally, motivation must develop the concept of curiosity, since the subject must feel the desire to know beyond what he/she is taught. Under the academic context in which this research is conducted, it is understood that a physician in training who is motivated and willing to acquire knowledge will become a health professional with sufficient intellectual and social skills to provide quality care to his patients.

A second pillar of learning is to know about learning strategies, which are defined as the actions and thoughts of students that occur during learning, which have a great influence on the degree of motivation and include aspects such as acquisition, retention and transfer (11). Learning strategies should be based on the knowledge that each subject has about him/herself, both in terms of his/her capabilities and possibilities, as well as his/her limitations and motivations to perform the task in question. There are several classifications of learning strategies, among them the proposal suggested by Weinstein and Mayer, who distinguish between cognitive, metacognitive and resource management strategies. On the other hand, the authors Román and Gallego propose four phases of strategy application: acquisition, encoding, retrieval and support of information (12).

On the other hand, it is known that each student tends to prefer certain learning styles in the way they interact, perceive, organize and process the information they acquire according to the tools they were given from the beginning as a student. This is defined as cognitive, affective and physiological ranges that behave as relatively stable indicators of how students perceive, interact and respond to their learning environments. According to Royert and Pestaña (13), the learning styles (balanced, visual, sensitive, sequential and active) are not related to the health area. Therefore, learning styles will not be relevant in the structuring of this research, since it is mainly focused on medical students. It is relevant to clarify this point and differentiate it from learning strategies in order to achieve the appropriate approach that we want to achieve with the research.

Based on the above, we chose to conduct a prospective cohort study, which consists of an observational follow-up of a group of people over time (13), since this type of study is suitable for the purpose of our research and can provide us with information about how motivation and learning strategies vary as students pursue a career in medicine.

3. Objectives and Hypotheses

General Objective:

To identify variation in motivation and learning strategies in a 2-year follow-up cohort study.

Specific objectives:

1. To determine the variation in motivation and learning strategies in female students.

2. To determine the variation in motivation and learning strategies in male students.

3. To analyze the variation in motivation and learning strategies between first and second year courses.

4. To investigate whether motivation and learning strategies are related to each other in the sample of students.

Hypothesis:

H01: Motivation and learning strategies do not vary between 1st and 2nd year female and male students.

H02: There is no relationship between motivation and learning strategies in the cohort.

4. Materials and Methods

Quantitative, observational, prospective cohort study to be carried out in the second semester of 2018. A sample of second year students of the Medicine career of the Universidad Andrés Bello, Viña del Mar campus, who compulsorily completed the survey in 2017, was included. The exclusion criterion is those who have withdrawn from the career between 2017 and 2018, not reaching the second academic year.

The survey was applied during class time, choosing the one in which, theoretically, all students who are in their second year should be present, without excluding failed subjects and who in 2017 had taken the previous survey.

This study has the approval of the bioethics committee granted by the Universidad Andrés Bello, as well as the informed consent presented to each of the students surveyed.

It was proposed to use the same questionnaire applied in 2017, this corresponds to the MSLQ test (Motivated Strategies for Learning Questionnaire) as an instrument to measure the variables motivation and learning strategies in the cognitive and metacognitive areas, in students studying at university (1). It is a self-report test validated academically by E. Burgos and P. Sánchez of the Universidad del Bío-Bío (14).

As for the dependent variables of our research, the motivational scale is divided into 2 main areas, extrinsic motivation being defined as the fact of performing activities for something other than one's own interest, such as some reward, or that the teacher does the subject in a way that is fun for the student. Another area to study corresponds to intrinsic motivation, which is defined as performing an activity not for external rewards, but for the direct enjoyment of an activity in itself (8). The second fundamental pillar is learning strategies, defined as actions and thoughts of learners that occur during learning, which have great influence on the degree of motivation and include aspects such as acquisition, retention and transfer (10). It should be noted that both are subject to the study of the independent variable corresponding to the sex of the medical students.

The data obtained were subjected to tabulation, according to sex and course, performing a statistical analysis of the variables studied by means of Pearson correlation with a $P<5\%$ and Student's Test. In addition, data obtained from the research carried out in 2017, on those students who were in their first year of Medicine at the same university, were used.

5. Analysis and explanation of the questionnaire

As for the intrinsic ordering of the MSLQ questionnaire, it presents a 7-point Likert-type format, describing the evolution according to: [1] It does not describe me at all [2] It describes me a little [3] It describes me moderately [4] I am not sure [5] It describes me sufficiently [6] It describes me a lot [7] It describes me completely. This has 81 items, dividing the central axis into two large scales, a motivational scale made up of 31 statements, and a learning strategies scale made up of 50 (1).

The motivation scale is subdivided into three central axes, which in turn are divided into six subscales:

- Valuation:
    - Intrinsic goal orientation

    - Extrinsic goal orientation
    - Task value
- Expectations:
    - Beliefs about the control of learning
    - Self-efficacy
- Affection:
    - Anxiety test

Within the learning strategies variable, it is subdivided into two central axes, which in turn are composed of nine subscales:

- Cognitive and metacognitive strategies:
    - Essay
    - Prepared by
    - Critical thinking
    - Organization
    - Metacognitive self-regulation
- Resource management strategies:
    - Study time and environment
    - Effort regulation
    - Peer learning
    - Search for help

Each sub-dimension has a variable or equal number of statements to be answered.

The results obtained will be tabulated according to the MSLQ manual proposed by The University of Michigan (13), where the assessment of questions M3, M14, M19, M28 and E2, E6, E9, E21, E26, E29, E47 corresponding to negatively formulated statements should be inverted.

The statistical analysis of the data obtained will be carried out with the SPSS (Statistical Package for the Social Sciences) software, through which the Pearson linear correlation coefficient, frequency, median, standard deviation will be calculated. The Chi-Square statistical test will be used, under the accepted degree of statistical significance of $P \leqslant 0.05$.

6. Results

Quantitative, observational, prospective cohort study to be carried out in the second semester of 2018. A sample of second year students of the Medicine career of the Universidad Andrés Bello, Viña del Mar campus, who compulsorily completed the survey in 2017, was included. The exclusion criterion is those who have withdrawn from the career between 2017 and 2018, not reaching the second academic year.

The survey was applied during class time, choosing the one in which, theoretically, all students who are in their second year should be present, without excluding failed subjects and who in 2017 had taken the previous survey.

The research has a total sample of 38 students of which 33 have participated in the process since their entry into the medical career in 2017, to date.

There are 5 students who were eliminated from the cohort because they did not meet the pre-established requirements.

Table 1: Cohort distribution by sex (n=33)

Sex	Absolute Frequency	Percentage (%)
Female	20	60,6
Male	13	39,4
Total	33	100

Out of a total of 33 students, there is a predominance of female students (60.6%).

Table 2: Mean motivation and learning strategies scores by gender by grade.

	SCALES AND SUBSCALES	BASIC STATISTICS BY GRADE AND GENDER					
		FEMALE			MALE		
		1	2	p	1	2	p
		Mean ± SD	Mean ± SD		Mean ± SD	Mean ± SD	
MOTIVATION	**EVALUATION**						
	Intrinsic goal orientation	5,89 ± 0,72	5,32 ± 0,91	0,013*	5,63 ± 1,01	5,31 ± 0,91	0,069
	Extrinsic goal orientation	5,5 ± 1,18	4,49 ± 1,28	> 0,05*	5,61 ± 1,19	4,77 ± 1,20	0,004*
	Task value	6,13 ± 0,95	5,46 ± 0,77	0,009*	5,86 ± 1,20	5,50 ± 1,01	0,354
	EXPECTATIONS						
	Beliefs about the control of learning	5,77 ± 0,83	5,21 ± 0,65	0,030*	6,06 ± 0,88	5,61 ± 0,67	0,079
	Self-efficacy	5,66 ± 0,65	5,22 ± 0,95	0,031*	5,95 ± 0,67	5,54 ± 0,78	0,117
	AFFECT						
	Anxiety	4,42 ± 1,18	3,93 ± 1,09	0,137	4,74 ± 1,32	4,46 ± 1,20	0,239
STRATEGIES	**COGNITIVE AND METACOGNITIVE**						
	Essay	5,61 ± 1,12	5,41 ± 0,89	0,433	5,17 ± 1,19	4,61 ± 1,15	0,065
	Prepared by	6,03 ± 0,66	5,51 ± 0,88	0,032*	5,67 ± 0,85	5,28 ± 1,05	0,134
	Organization	6,00 ± 0,86	5,97 ± 0,86	0,916	5,17 ± 1,48	4,94 ± 1,60	0,538
	Critical Thinking	5,09 ± 1,25	4,82 ± 1,09	0,244	5,14 ± 0,77	5,31 ± 1,25	0,623
	Metacognitive Self-Regulation	5,03 ± 0,68	5,01 ± 0,82	0,927	5,00 ± 0,59	4,97 ± 0,67	0,872
	RESOURCE MANAGEMENT						
	Study time and environment	4,92 ± 0,40	4,80 ± 0,92	0,549	4,97 ± 0,62	4,97 ± 0,89	1
	Effort regulation	6,04 ± 0,82	4,77 ± 1,09	> 0,05*	5,92 ± 1,02	5,02 ± 1,02	0,002*
	Peer learning	5,08 ± 1,43	4,47 ± 1,74	0,020*	5,38 ± 1,25	4,18 ± 1,44	0,002*
	Search for help	5,37 ± 1,01	4,72 ± 1,36	0,012*	5,58 ± 1,02	4,63 ± 1,23	0,01*

In the comparison of female students according to course, through the test for independent samples, significant results were obtained ($p<0.05$), showing a decrease for the variables intrinsic goal orientation (IMO), extrinsic goal orientation (EMO) and task value (TVV), present in the motivation scale, for the female sex.

The expectations axis shows a significant decrease in the mean of the second year scores for beliefs about control over learning (CCA) and self-efficacy (SA). Within the learning strategies variable, in the cognitive and metacognitive axis, it is observed that the female sex presents a significant decrease ($p<0.05$), only in the mean of the elaboration subscale score (EL), compared to the first year, and in the resource management axis, a significant decrease is observed ($p<0.05$) in the mean of the scores of the elaboration subscale (EL), compared to the first year.0.05) of the mean scores of their second year, in the subscale of effort regulation (RE), peer learning (AI) and help seeking (BA), compared to their first year.

The average for first-year women is significantly lower than the average in the second year, with the exception of the affect variable.

Table 3: Mean motivation and learning strategies scores by course.

	SCALES AND SUBSCALES	BASIC STATISTICS BY COURSE		
		1º Total (n=33) Mean ± SD	2º Total (n=33) Mean ± SD	p
MOTIVATION	**EVALUATION**			
	Intrinsic goal orientation	5,79 ± 0,84	5,32 ± 0,89	0.002*
	Extrinsic goal orientation	5,56 ± 1,16	4,60 ± 1,24	> 0,05*
	Task value	6,02 ± 1,05	5,47 ± 0,86	0,010*
	EXPECTATIONS			
	Beliefs about the control of learning	5,89 ± 0,85	5,37 ± 0,68	0,005*
	Self-efficacy	5,77 ± 0,67	5,34 ± 0,89	0,006*
	AFFECT			
	Anxiety	4,54 ± 1,23	4,14 ± 1,44	0,06
STRATEGIES	**COGNITIVE AND METACOGNITIVE**			
	Essay	5,44 ± 1,15	5,10 ± 1,06	0,076
	Prepared by	5,89 ± 0,75	5,42 ± 0,94	0,007*
	Organization	5,67 ± 1,19	5,57 ± 1,29	0,599
	Critical Thinking	5,11 ± 1,07	5,01 ± 1,16	0,614
	Metacognitive Self-Regulation	5,02 ± 0,63	4,99 ± 0,76	0,87
	RESOURCE MANAGEMENT			
	Study time and environment	4,94 ± 0,49	4,87 ± 0,90	0,62
	Effort regulation	5,99 ± 0,89	4,87 ± 1,05	> 0,05*
	Peer learning	5,20 ± 1,35	4,35 ± 1,61	> 0,05*
	Search for help	5,45 ± 1,00	4,69 ± 1,29	> 0,05*

It is observed that for motivation, both the valuation and expectations axes presented significant decreases in their subscales during the second year.

In the learning strategies, the cognitive and metacognitive axis, only elaboration varied, significantly decreasing its value during the second year. In the resource management axis, the subscales of effort regulation, peer learning and help seeking varied, decreasing significantly in value from one year to the next.

The course group average in the second year is significantly lower than the average in the first year, with the exception of the affect variable.

Table 4: Correlation between motivation and learning strategies of first-year students.

Correlation 1st year (n = 33)	**MOTIVATION**								**LEARNING STRATEGIES**					
	r	p	Valuation		Expectations		Affection		r	p	Cognitive and metacognitive strategies		Resource management	
			r	p	r	p	r	p			r	p	r	p
MOTIVATION			0,548*	0,001*	0,702*	>0,01*	0,701*	>0,01*	0,424	0,014	0,226	0,206	0,516*	0,002*
Valuation	0,548*	0,001*			0.576*	>0,01*	-0,147	0,414	0,512*	0,002*	0,449*	0,009*	0,469*	0,006*
Expectations	0,702*	>0,01*	0,576*	>0,01*			0,127	0,481	0,315	0,075	0,120	0,506	0,424	0,014
Anxiety	0,701*	>0,01*	-0,147	0,414	0,127	0,481			0,144	0,529	-0,027	0,880	0,215	0,230
LEARNING STRATEGIES	0,424	0,014	0,512*	0,002*	0,315	0,075	0,114	0,529			0,882*	>0,01*	0,911*	>0,01*
Cognitive and metacognitive strategies	0,226	0,206	0,449*	0,009*	0,120	0,506	-0,027	0,880	0,882*	>0,01*			0,609*	>0,01*
Resource management	0,516*	0,002*	0,469*	0,006*	0,424	0,014	0,215	0,230	0,911*	>0,01*	0,609*	>0,01*		

Pearson's correlation was used to evaluate the independence between the variables motivation and learning strategies, with their respective subscales of the first-year students.

It is observed that the valuation variable presents positive and significant correlations with the variables expectations, cognitive and metacognitive strategies and resource management. Therefore, the existence of a ρ different from 0, with a positive correlation shows that there is a dependent and linear relationship between the variables valuation and expectations/cognitive and metacognitive strategies/resource management in the first year group.

In the expectations variable, there is a positive and significant correlation with the valuation variable. Therefore, the existence of a ρ different from 0, with a positive correlation shows that there is a dependent and linear relationship between the variables expectation and valuation in first year students.

With respect to the affect axis, there is only a positive correlation with expectations and resource management; however, these are not significant. Therefore, there is no significant relationship between the variable affect and expectation/resource management in first year students.

In the cognitive and metacognitive strategies variable, there is a positive and significant correlation with the valuation and resource management axis. Therefore, there is a dependent and linear relationship between the cognitive and metacognitive strategies variable and valuation/resource management in the first year group.

In addition, the resource management variable presents a positive and significant relationship with appraisal and cognitive and metacognitive strategies. Therefore, there is a dependent and linear relationship between the resource management variable and appraisal/cognitive and metacognitive strategies in the first year course.

There is a relationship between the variables of the axes motivation and learning strategies in the first year group.

Table 5: Correlation between motivation and learning strategies of second year students.

Correlation 2nd year (n = 33)	MOTIVATION								LEARNING STRATEGIES					
	r	p	Valuation		Expectations		Affection		r	p	Cognitive and metacognitive strategies		Resource management	
			r	p	r	p	r	p			r	p	r	p
MOTIVATION			0,605*	>0,01*	0,832*	>0,01*	0,805*	>0,01*	0,470*	0,006*	0,425	0,014	0,420	0,015
Valuation	0,605*	>0,01*			0,590*	>0,01*	0,066	0,717	0,662*	>0,01 *	0,553*	0,001*	0,637*	>0,01*
Expectations	0,832*	>0,01*	0,590*	>0,01*			0,465*	0,006*	0,432	0,012	0,382	0,028	0,396	0,022
Anxiety	0,805*	>0,01*	0,066	0,717	0,465*	0,006*			0,132	0,465	0,151	0,400	0,087	0,628
LEARNING STRATEGIES	0,470*	0,006*	0,662*	>0,01*	0,432	0,012	0,132	0,465			0,895*	>0,01*	0,905*	>0,01*
Cognitive and metacognitive strategies	0,425	0,014	0,553*	0,001*	0,382	0,028	0,151	0,400	0,895*	>0,01*			0,620*	>0,01*
Resource management	0,420	0,015	0,637*	>0,01*	0,396	0,022	0,087	0,628	0,905*	>0,01*	0,620*	>0,01*		

It is observed that the variable valuation presents positive and significant correlations with the variables expectations, cognitive and metacognitive strategies and resource management.

In the expectations variable, there is a positive and significant correlation with the valuation and affection variable. Therefore, the existence of a ρ different from 0, with a positive correlation shows that there is a dependent and linear relationship between the variables expectation and valuation/affection in second year students.

With respect to the affection axis, there is only a positive correlation with expectations, significant at 1%. Therefore, there is a dependent and linear relationship between the variable affect and expectation in second year students.

In the cognitive and metacognitive strategies variable, there is a positive and significant correlation with the valuation and resource management axis. Therefore, there is a dependent and linear relationship between the cognitive and metacognitive strategies variable and valuation/resource management in the second year group.

Moreover, the resource management variable shows a positive and significant relationship with appraisal and cognitive and metacognitive strategies. Therefore, there is a dependent and linear relationship between the resource management variable and appraisal/cognitive and metacognitive strategies in the second year course.

There is a relationship between the variables of the axes motivation and learning strategies in the second year group.

7. Discussion

The work presented analyzed motivation and learning strategies in a sample cohort of medical students (both first and second year) of the Universidad Andrés Bello, Viña del Mar campus, with 2 years of follow-up. Next, the findings will be examined and organized according to the objectives.

Initially, the behavior of the variables of the MSLQ questionnaire of motivation and learning strategies was compared, both by sex and by course of the sample studied (n= 33). In relation to motivation and previous studies analyzed, it was determined according to the objectives set, that only the female sex presented significant decreases with respect to the previous year; it is worth mentioning that no variations were observed in the anxiety of the groups. With respect to the scale of learning strategies, it was obtained that both the female and male sexes decreased significantly in terms of resource management, compared to the previous year. Thus, analyzing the results of the total sample by course, a significant decrease was observed from one year to the other, corresponding to the same variables as for the female, which could be explained by the higher proportion of the female sex in the cohort (60.6%).

In addition, it was identified that Va vs Ex, Va vs ECM, Va vs GR and ECM vs GR were directly correlated during the 2 consecutive years, while Ex (expectations) vs Af (affection) only during the second year a correlation was observed, from the above it is evident that Va (valuation), within motivation, contributes directly on the axes of learning strategies, contributing to the students' aptitudes. The previous result only corroborates previous studies, such as those of María Rinaudo, Analía Chiecher and Danilo Donolo, where they confirm the findings regarding the existence of an association between motivation and use of strategies (16), as well as those obtained by María José Anais, Ana María, et al, in which they suggested that both the motivational and cognitive components of the learning process are relevant and interact with each other (17).

The knowledge that the use of learning strategies is higher in university students shows the importance of intervening before entering higher education. In this sense, Martínez affirms that university students must adopt changes at the cognitive, behavioral and affective-relational levels in order to intervene successfully and with initiative in the university teaching and learning processes (18). Naturally, to achieve this, the university student must have the motivation to do so. In relation to the results obtained in this study, it is observed that the cognitive and metacognitive strategies were maintained without variation from one year to the other, on the other hand, resource management decreased significantly, which allows us to infer that the students analyzed have not improved their learning strategies after one university year, so it becomes an objective to intervene, for the improvement of educational quality.

Based on the above, it is important to emphasize the results obtained by Martínez and Galán, where a significant relationship was obtained between the levels of learning strategies and the students' results in formative assessment. Among the group that rated themselves as having high learning strategies, 70.8% obtained success in the formative evaluation, and among the students who placed themselves in the low level of learning strategies, 53.2% did not obtain success. Therefore, intervention in this aspect would also be justified (19).

It can be added that according to Francisco Martín del Buey and Francisco Camarero Suaréz there is a difference in the learning strategies of university students according to sex, since female students are the ones who use different techniques when facing their learning.

According to the results obtained in this research, the sample studied showed a significant decrease in the motivational scale between the first and second year of medical school. It should be noted that motivation can be studied from many points of view, but its interest is centered on the psychological aspect since it activates the behavior of the human being (20). Currently, the most widely used motivational theory is based on the differentiation of two large groups: intrinsic or the subject's own motivation and extrinsic or the environment's own motivation (Aguado, 2005). Both subscales were evaluated according to course, inferring that students were more motivated at the beginning of their university career than once they were in their second year. This difference contrasts with the study conducted in 2012 (21) where the motivation of medical students between first and seventh year was evaluated, resulting in a greater interest in science in those who have just entered the career, on the other hand, the seventh year interns propose social interest (help) as their greatest motivation. The fact that first year students have a greater interest in science than in the social and helping field is related to the thinking of students recently graduated from high school, with the vision of the medical career as proper to science and technology, rather than altruistic as it has moved away in recent years. As mentioned (16), a student motivated from the intrinsic perspective selects and performs activities out of interest, curiosity and the challenge they provoke, being characteristics of a student who starts university studies.

It should be noted that first year students have subjects of less complexity and time load in comparison with second year students, who have subjects such as Anatomy, Physiology, Histology, among others, in addition to the fact that the number of hours in the classroom is much higher. It is worth considering that second year students at Universidad Andrés Bello perform a clinical practice limited to a first approach to patients. According to the study carried out by the Universidad San Sebastián (22), the encounter with the patient can have two repercussions in the career of a doctor in training: the reaffirmation of the vocation or the reorientation of a study project.

A second aspect that motivates the development of independent study skills as part of an intrinsic motivation in the student is how they perceive the doctor-patient relationship. According to a study conducted in 2016 by the Universidad de Concepción (23), the link between the student and the patient allows understanding the physician's work context and visualizing the other in this didactic relationship. This relationship fosters motivation in the active search for information that allows the medical student to solve the needs of this interaction, resorting to texts that are oriented to clinical practice and patient treatment.

Likewise, it is reaffirmed that students are more motivated when they have more contact with patients; on the contrary, due to the heavy workload and demands of the second year, students are not able to acquire sufficient motivation. In this regard, it is suggested to promote strategies that encourage students' vocation from the beginning of the career as a direct contact with patients from the first subjects.

With respect to the results obtained when evaluating the Affective variable, these do not show a significant decrease. For María Cristina Rinaudo (2003) (16) the evaluated affectivity is related to anxiety levels, and in turn this component is linked to negative thoughts on the part of the subject and excessive concern for academic performance. This shows that in medical students, anxiety does not affect a course of greater complexity than another, nor the fact of being female or male.

According to the results obtained when analyzing the first year students, we can see that the null hypothesis is accepted, therefore, there is no relationship between the motivation variable and learning strategies. This is associated to the immaturity and scarce responsibility that students recently graduated from high school reflect. On the contrary, according to the results of the second year students, there is a correlation between motivation and learning strategies, which leads to an acceptance of the null hypothesis.

The above is reinforced by the results obtained from the research of the University of Granada, Spain (2009) (24) which indicates that university students must show sufficient academic maturity to guarantee the necessary autonomy in study and learning. Furthermore, according to a study by the University

of Concepción (2013) (25) successful students are characterized by possessing self-regulation strategies and adopting a deep approach to learning. It is worth mentioning, that students in the second year of the career already begin to successfully develop such strategies.

According to the analysis of the results, we can affirm that the strengths were to allow knowing the preferences of the students regarding study, considering motivation as a central fact of this process, directly influencing the learning strategies used by the students. It was also to know how many and which learning strategies the students use for study and how these influence the acquisition of knowledge, the degree of motivation presented by the students and the characteristics of their learning. With this information collected, workshops or courses could be held on how to study and teach what strategies exist for that in order to have a better process of knowledge acquisition and to know all the learning styles that exist and which is the most appropriate for each person.

Among the limitations of our work, we can point out as the most important the fact that there was a loss of follow-up, which, being a cohort study, meant that our study sample was reduced by an important percentage and could even affect the selection bias. It should also be noted that a possible limitation would be the fact of not having related our results to the performance of the cohort, because although we obtained valuable and significant information regarding the learning strategies and motivation of the students, this alone would not allow the institution to make changes with the objective of improving the grades or performance of its students. In other words, a complementary study would be needed to obtain sufficient information to make changes in the study model.

With the findings obtained, it would be possible to begin to develop a new university curriculum or improve the current one, where activities and trainings could be carried out, in order to obtain improvements in the levels of motivation and learning strategies. In addition, one could continue with the same cohort and evaluate in each year how motivation and learning strategies are changing and the consequences that this generates for the student and their academic environment. In other words, the implications of the research could be a guide or reference for study centers, especially in medicine, regarding possible situations of intervention in search of academic improvement.

In the development of this work, the main difficulty we faced was the loss-to-follow-up bias, due to the fact that there was a considerable number of students that could not be contacted. If this had been the case, the study would have been seriously affected, even to the point of invalidating the results due to an insufficient sample.

It is highly relevant that the medical student is comfortable with what he/she is doing, and motivated to learn, since as explained above, a motivated student has a better disposition to learn and be able to grasp new concepts, which becomes fundamental in a career such as medicine where a single mistake can cost someone else's life. We consider that the decrease in motivation seen in the second year of this study is worrisome, since if it continues to decrease in the following years we would be faced with the fact that students are not learning everything they should and could lead to accidents in practice in the future due to lack of knowledge about how to proceed in a certain situation because it was not learned correctly.

In the area of learning strategies we found that the students did not know how to manage the given resources (peer learning, help seeking and effort regulation), which in the second year of the course should have increased, but it did the opposite, it decreased, which could tell us that the students are closed to themselves and do not live with others when they need it or in case of not knowing something they are not turning to the professor in charge, which in the end is reflected in learning incorrect concepts or incomplete learning, which could lead to an error in medical practice.

It is of utmost importance to emphasize that in this career they will have in their hands the lives of other people, therefore students should learn in the best way, i.e. being motivated and having a good use of the learning strategies that are given to them. It is suggested to carry out an intervention both in the first year and in the second year to favor higher levels of motivation and cognitive commitment, such as the implementation of workshops where the student can relate with the patient, so that they do not lose the innate curiosity of the medical student, and at the same time promote their own abilities to relate with the patient, being able to improve their empathy and respect towards others, values that should be highlighted in a professional physician.

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