TECCIENCIA

Personality Profile of a Group of Cyto-Histotechnology Students

Perfil de Personalidad de un Grupo de Estudiantes de Citohistotecnología

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Abstract

By 2012, the National Ministry of Education in Colombia recognized 286 Institutions of Higher Education (IHEs) in the country that offered technical and technological programs. The quality of technicians, technologists, and other professionals is directly related to their performance during secondary and tertiary education. The aim of this paper is to describe the personality profile and academic performance of a group of Cytology and Histology students at a Health Sciences institution of higher education. We performed a descriptive study that included first to third semester students in the Department of Cytology and Histology. We measured socio-demographic variables related to academic achievement and the Gordon Personal Profile-Inventory (GPP-I) test results. This study was approved by the Ethics for Research on Humans Committee at the Fundación Universitaria de Ciencias de la Salud. We analyzed 53 Cytology and Histology students. The average age was 18 years old (IQR 18-21), and the gender distribution was 88.4% female (46/53). The initial grade mean was 3.5 (IQR: 3.3-3.8), with 5 being the maximum in the Colombian grading system, and the mid-career grade was 3.7 (IQR: 3.6-4). We explored the relationship between the place of residence before starting the program, the result of the National Test for Graduates in Colombia (ICFES-SABERPro, comparable to the American SAT), and the academic performance of students. We observed a significant correlation among these variables. Despite there being a number of university departments in the field in Colombia, Cytology/Histology is a poorly known profession, and the skills and abilities together with its range of tasks in the labor market are unknown. Concerning academic performance and its correlation with the GPP-I domains, we observed that there was a direct relationship between starting grade point average and original thinking.

Keywords: Cytology, Histology, Personality Profile, Academic Performance.

Resumen

En Colombia para el año 2012 fueron reconocidas 286 Instituciones de Educación Superior (IES), las cuales ofertan programas técnicos y tecnológicos. La calidad de los técnicos, tecnólogos y profesionales está relacionada directamente con su desempeño durante el colegio y la carrera. Describir el perfil de personalidad y su desempeño académico de un grupo de estudiantes de Citohistología, en una institución de educación superior de ciencias de la salud. Se realizó un estudio descriptivo, donde se incluyeron estudiantes de primero a tercer semestre de la Facultad de Citohistotecnología. Se midieron variables sociodemográficas, relacionadas con el desempeño académico y resultados de la prueba de inventario de personalidad de Gordon (P-IPG). Este estudio fue aprobado por el comité de ética de investigación con seres humanos de la Fundación Universitaria de Ciencias de la Salud. Se analizaron 53 estudiantes de Citohistología, la mediana de edad fue de 18 años (RIQ: 18-21), la distribución por género fue 46 mujeres (88.4%). La mediana de notas al inicio de carrera fue de 3.5 (RIQ: 3.3-3.8), y mitad de carrera 3.7 (RIQ: 3.6-4). Se exploró la relación entre el lugar de vivienda antes de iniciar el pregrado, el resultado del ICFES-SABERPro y el rendimiento académico, observando una relación estadísticamente significativa. La Citohistotecnología actualmente es poco conocida a pesar de que existen varias facultades en Colombia y no se conoce

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claramente las destrezas y habilidades de su desempeño en el campo laboral. Con respecto al rendimiento académico y su correlación con los dominios del P-IPG, se observó que había una relación directamente proporcional entre el promedio inicial de carrera y la originalidad

Palabras clave: Citohistología, Perfil de Personalidad, Rendimiento Académico.

1. Introduction

Cytology and Histology study the theoretical and practical bases for the handling and preparation of human, animal, or vegetable tissues, allowing for observation under a microscope as an aid in diagnosis. It is a vital tool in the detection of diseases, such as oncological pathologies [1] [2] [3] [4] [5]

By 2012, the National Ministry of Education in Colombia recognized 286 Institutions of Higher Education (IHEs) in the country offering technical and technological programs, depending on their academic character [1] (see Table 1). The inclusion of technical and technological programs in the IHEs is a result of the process of development, research and technological innovation which Colombian society is currently undergoing. This is a priority in the development of the country, leading to an increase in higher education coverage, based on the needs of various sectors.

The skill set of technicians, technologists, and professionals is directly related to their performance in higher education and college [2]. These are significant factors that make up part of different realms of the admission process run by the IHEs. Usually, selection is based on a series of tests which aim to acquire knowledge about the basic skills of the person (from academic to personal) [3]. It is common for each institution to have a specific selection profile for their academic program, including not only skills, but also human caliber since these are part of a wide-ranging education for any student [2] [3]. This evaluation involves the application of psychometric tests that identify personality traits, which can help assess the individual considering the graduate profile.

In the area of health (health care organizations), human resource needs become increasingly frequent. This is why the IHEs as supporters of the creation of human capital must recognize this demand for professionals and prepare graduates to succeed in the labor market [4].

We thus set out to describe the personality profile of a group of Cytology and Histology students. This profiling will contribute to the structuring of a health technologist profile, and will have an impact on employability opportunities and quality of life. Moreover, this profile is described along the lines of public policy in technical and technological

education, which refers to educating not only workers but also citizens with new attitudes and skills through a flexible curriculum, consistent with the social demands as conditions for the increase in competitiveness [1] [3].

Table 1 Distribution of IHEs in Colombia

Institutions of Higher Education (IHEs)	Percentage
Universities	33%
Colleges	26.8%
Technological Institutes	21.7%
Technical Institutes	18.5%

2. Materials and Methods

We performed a descriptive study which included first to third semester students in the Department of Cytology and Histology Faculty in a health science IHE. We measured the following variables: gender, age, type of high school (academic, technical, or 'business', typical Colombian high school categories), grades at the start of the undergraduate program and in the middle, parents' occupations, and the Gordon Personal Profile-Inventory (GPP-I) test results [6]. The information was collected from the program data held and reported by the software ACADEMUSOFT, which was later transcribed onto a spreadsheet. We based the variable 'occupation' on the classification suggested by the Organization of Ibero-American States (OEI for its Spanish acronym) and applied by the National Apprenticeship Service (SENA for its Spanish acronym) [7].

Instruments: the GPP-I Test is a psychometric scale that measures five profiles and four personality inventories, which are described as follows: *ascendancy* – verbally-dominant; *responsibility* – able to stick to the job assigned to them; *emotional stability* – usually stable and free from worries; *sociability* – enjoy being and working with others; *self-esteem* – desirable and undesirable characteristics (positive thoughts about themselves); *cautiousness* – cautious before making any decisions or performing any task; *original thinking* – enjoy working on difficult problems and are curious; *personal relations* – place trust and faith in others; *vigor* – energetic and enjoy fast-paced work.

2

The categorization of the results was performed in accordance with the recommendation of the authors: very high (81-100 points), high (61-80 points), medium (41-60 points), low (21-40 points) and very low (0-20 points) [6]. The scale was validated for Mexican Spanish and used for the selection and admission of students in IHEs. Statistical analysis was performed in the program Stata 12. Also, the distribution data was explored using the Shapiro-Wilk statistical test to determine the use of parametric tests. Central tendency and dispersion measures were used for quantitative variables and absolute and relative frequencies were used for qualitative variables.

Additionally, we analyzed the correlation using the Pearson product-moment correlation coefficient. Our study was approved by the Ethics for Research on Humans Committee at the Fundación Universitaria de Ciencias de la Salud.

3. Results

We analyzed 53 Cytology and Histology students. Forty-five students reported their socioeconomic status at the beginning of their undergraduate studies, employing the Colombian 'strata' system, a scale of 1 to 6 with 1 being the poorest and 6 being the wealthiest. The data was distributed as follows: 16 students in 2nd strata (35.6%), 24 students in third strata (53.3%), and 5 students in fourth strata (11.1%). Seven students (13.4%) came from outside of Bogota city. The rest of the sociodemographic characteristics are presented in Table 2. As far as the type of high school they graduated from, according to the National Ministry of Education, 38 students graduated from an academic high school (74.5%), 9 students from technical high schools (17.6%), and 4 students from 'business-oriented' high schools (7.8%).

Nineteen students (35.8%) reportedly repeated a class during their academic careers, and seven (63.6%) made up a class. All 52 (100%) of the students mentioned having graduated from "Calendar A" high schools, meaning the school year begins in January and ends in November. The Gordon Personal Profile-Inventory (GPP-I) test was applied voluntarily on first semester students and answered by 27 students (51.9%). Results are seen in Table 3.

Now for the parents' occupation variable. We found that 8 of their fathers (15.3%) worked in sales or service jobs, 8 (15.3%) in transport or equipment operations, 7 (13.4%) retired, 6 (11.5%) were employed in finance and administration, 4 (7.6%) in social sciences, public administration, education, and religion, and 3 (5.7%) in applied natural sciences and related fields. As for the occupation of their mothers, 22 students (38.4%) had mothers who were housewives, 7 (13.4%) who worked in finance and business administration, 8 (15.3%) who worked

in finance and business administration, 3 (5.7%) who worked in health, and 3 (5.7%) who worked in social sciences, public administration, education, and religion.

Table 2 General characteristics of the population

	No.	(%)
Gender - Female	46	(88.4)
Age - *Mean (IQR)* ‡	*18*	(17-21)
Origin - Bogota	45	(84.9)
Type of high school		
Public	22	(43.3)
Private	29	(53.6)
Type of high school program		
Academic	38	(71.6)
Technical	11	(20.7)
Business	9	(16.9)
ICFES (National Education Test)† - *Mean (IQR)* ‡	*45.3*	(42.1-49.1)
Undergraduate program grades - *Mean (IQR)*		
Beginning	*3.5*	(3.3-3.8)
Halfway through	*3.7*	(3.6-4)

† Results presented in % accumulated by area
‡ Shapiro-Swilk p<0.05

Table 3 Gordon Personal Profile-Inventory (GPP-I) test results

Domain	Categorization No. (%)				
	Very High	**High**	**Medium**	**Low**	**Very Low**
Responsibility	22 (73.3)	5 (16.6)	2 (6.6)	1 (3.3)	0 (0)
Emotional stability	3 (11.1)	12 (44.4)	3 (11.1)	4 (14.8)	5 (18.5)
Sociability	1 (3.7)	1 (3.7)	12 (44.4)	10 (37)	3 (11.1)
Cautiousness	8 (29.6)	8 (29.6)	7 (25.9)	4 (14.8)	0 (0)
Original Thinking	4 (14.8)	13 (48.1)	7 (25.9)	3 (11.1)	0 (0)
Personal Relations	5 (16.6)	3 (11.1)	13 (48.1)	5 (16.6)	1 (3.3)
Vigor	6 (22.2)	14 (51.8)	4 (14.8)	3 (11.1)	0 (0)
Ascendancy	11 (40.7)	7 (25.9)	7 (25.9)	1 (3.7)	1 (3.7)

4. Discussion

Cytology/Histology is the field tasked with studying, processing and coloring the cell structure, with the aim of identifying and diagnosing diseases.
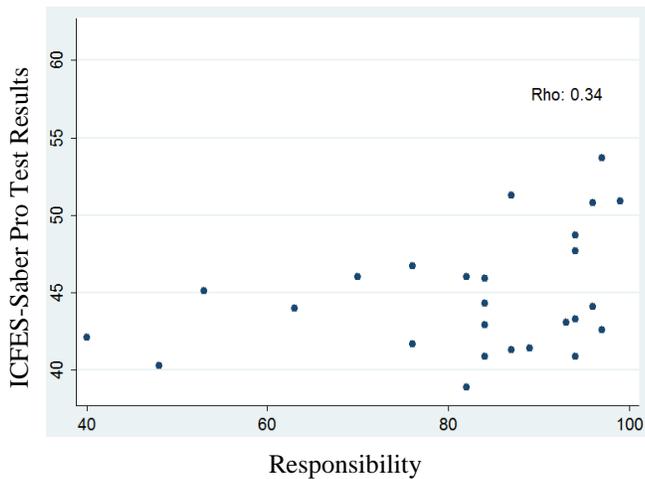
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Figure 1 Dispersion between ICFES-SABER Pro results and the *Responsibility* domain

These skills are applied, in most cases, in pathology laboratories, where professionals deal with fixing samples, manufacturing reagents, cutting tissue blocks, reading cytology, immunohistochemistry, and filing and controlling slides, among other functions [8] [9]. This area of health is poorly-known at present in Colombia, although there are several faculties around Latin America. In Colombia there are currently two institutions of higher education with Cytology and Histology departments: the Fundación Universitaria de Ciencias de la Salud, with a 21-year history, and Institución Universitaria Colegio Mayor de Antioquia [9].

In spite of the above, there has been adequate employment demand for the volume of technologists graduating every semester. Technical and technological education is a national measurement, as seen in the "Bulletin for trends of occupations at a National and Regional level, first quarter of 2014". It shows that technicians and technologists, depending on their level of qualification, rank third, at 44%, in employment rate positioning in Colombia [10]. These results can likely be related to those in our study, since the ages of the students who complete their studies is between 20 to 22 years, thus entering the labor market at an early age.

At present in Colombia, Resolution 5810 of 1976 regulates the activity of Cytology and Histology technologists and recognizes as cytotechnologists people who are trained to serve as assistant to the pathologist [11]. For this reason, the selection process of higher education candidates is based on personality profiles for each program. Gonzalez sums it up in the term "vocational choice," which is part of the self-allocation made by each candidate when choosing their life project, related to their mental abilities and their intelligence structure [12]. These factors have an impact on the good

performance of their activities as technologists, taking into account the holistic education of the individual. These technical and personal skills go hand in hand with the social responsibility that every cytotechnologist and histotechnologist has in detecting cervical carcinoma, which is one of the major public health problems in Colombia. In 2010, 33,450 deaths from cancer were registered, 17,069 of which were women, with a mortality rate of 74.1 per 100,000 [13].

Therefore, in this study we determined that 22 students (73.3%) scored "very high" in the domain Responsibility. This shows that future technologists perceive of their role as important in society. On the other hand, it is of note that only 5 students (16.6%) consider Personal Relations very important, considering that many future technologists will have contact with patients in the sampling process.

Concerning academic performance and its correlation with the GPP-I domains, we observed that there was a direct relationship between initial grade point average and Original Thinking (Rho: 0.24). For grade point average halfway through the program we found a relationship with Original Thinking (Rho: 0.25), Cautiousness (Rho: 0.20), and Responsibility (Rho: 0.36). This shows how the profile can be associated with academic performance, suggesting that students with good academic performance are characterized by performing tasks assigned, studying every situation before making decisions, and being intellectually restless. These profiles, although transversal, dominate in Cytology and Histology students, considering the processes that, from a technical point of view, they perform when preparing a tissue, a medical sample product, or biopsy.

In terms of age, it is of note that they are between 16 and 40 years, with an average of 19 years old. This implies that Cytology and Histology students have the ability to finish their studies at a relatively early age, facilitating their insertion in programs related to other areas of health. Likewise the study showed that students have a grade point average of 3.5 (of 5) at the beginning of their studies and display a significant increase at the end of the program. We highlight the fact that older students have a higher grade point average compared to young students.

The Cytology and Histology department offers classes on scientific foundation (basics), such as a Histological Technique course, which was repeated by 63.6% of students. This is a relatively low percentage of students compared to the English class, in which 83.8% repeated or made up; nonetheless, this class is not part of the specialization classes and the required level of English is basic, being a technological study program. This result, directly related to bilingualism, is a clear sign of the lack of preparation that secondary education invests in student in the mastery of a

4

second language, as also shown in the ICFES SABER 11 exam [14].

Finally, this study is important for our society, considering that the characterization of students of the Cytology and Histology department gives an idea of their training, in accordance with the labor market needs and the personality profile of the students. The study suggests that one should take into account the requirements of the Ministry of Education for technical and technological study programs and the socioeconomic characteristics of the population as factors that affect education results in Colombia [15].

5. Conclusions

Cytology and Histology is a poorly-known field in Colombia, despite the existence of several departments in the country. Few are aware of the skills and abilities of the profession, nor of its range of work in the labor market.

Considering academic performance and its correlation with GPP-I domains, we observed a direct relationship between the initial grade point average and *Original Thinking* score. This suggests that students with good academic performance accomplish assigned tasks, study situations before making decisions, and are intellectually restless.

During the development of the technologist at the undergraduate level, higher education institutions must take into account transversal proficiencies (both disciplinary and ethical) as part of the skillset of cytotechnologists and histotechnologists.

Acknowledgements

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