

Characteristics among six generations of medicine graduates

Caracterización de seis generaciones de egresados de medicina

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Abstract

Background: Medical graduate's follow-up programs allow the improvement of the curriculum of the Medicine career. Through identifying opportunity areas and strengthening points, institutions become increasingly competitive. **Objective:** The objective of the study was to identify the socio-demographic, formative, labor insertion, and satisfaction characteristics among six generations of graduates of the Medical School of the Faculty of Medicine of the National Autonomous University of Mexico (2004-2009). **Methods:** It is a descriptive, cross-sectional, retrospective, and comparative study integrating the answers of mailed electronic questionnaires to 5295 graduates who concluded studies between 2004 and 2009. Descriptive and inferential techniques were used for analysis. **Results:** An upward trend in the number of years to conclude the career was identified and an increase in failed assignments in the last three generations. Noticeable was also that, as time went by, the incorporation of physicians into the labor market was slower. Although, the percentage of general unemployment was very low (2.9%). **Conclusions:** There are no major changes in the characteristics of the Medicine graduates. Although it is necessary to identify, the reason for the increased in failed assignments which affects the length of completion. Further improvement in Research and Social Medicine programs are to be considered.

Keywords: Medical school. Satisfaction. Curriculum. Employment.

Resumen

Antecedentes: Los programas de seguimiento de egresados permiten mejorar los programas y el currículo de la carrera de Medicina, identificando las áreas de oportunidad y haciendo más competitivas a las instituciones educativas. **Objetivo:** Identificar las características sociodemográficas, formativas, de inserción laboral y de satisfacción, en seis generaciones de egresados de la carrera de Medicina de la Universidad Nacional Autónoma de México (2004-2009). **Método:** Estudio descriptivo, transversal, retrospectivo y comparativo, con 5295 egresados de la carrera de Medicina que concluyeron entre 2004 y 2009. Se envió un cuestionario por correo electrónico a cada uno de los egresados y se analizaron los resultados mediante técnicas descriptivas e inferenciales. **Resultados:** Se observó un incremento en el número de años para concluir la carrera y un aumento en el número de materias reprobadas en las últimas tres generaciones. Además, hubo mayor lentitud en la inserción laboral en el mismo periodo, aunque el porcentaje de desempleo general fue muy bajo (2.9%). **Conclusiones:** No hay cambios en la caracterización de los egresados respecto a generaciones anteriores; no obstante, será fundamental identificar las

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causas del incremento en el número de materias reprobadas que está afectando la eficiencia terminal, además de mejorar los programas de investigación epidemiológica y socio-médica.

Palabras clave: Escuela de medicina. Satisfacción. Currículo. Empleo.

Introduction

In Mexico, as in many other countries in the world, the tendency to evaluate and certify the quality standards of physicians and health institutions, as well as those of educational institutions, has increased in the past two decades¹⁻⁵.

Public and private higher education institutions recognize the enormous responsibility they have in training the professional resources that are to be inserted in the labor market and thus keeping the population healthy and productive. At present, universities are moving from complacent training processes to those of high social and administrative responsibility, which seek to optimize their training processes even through peer evaluations and self-evaluations, as student and graduate follow-up programs (SGFUPs) can be interpreted⁶⁻⁹.

SGFUPs available in many medical schools and faculties have allowed to advance in the improvement of programs and the curriculum, by identifying areas of opportunity and strength, making educational institutions increasingly competitive^{6,8,10}.

Therefore, the weight universities have in the incorporation of individuals into the health market is evident, guaranteeing not only the good of the community, but also that of the medical graduates who are to join the labor market to bring resources to their families^{11,12}.

It should be remembered that some of the classical theories aimed at understanding the education versus work binomial, which despite the time that has elapsed since their publication, continue to have a certain validity, if only partial, since none of them manages to explain by itself the relationship between education and work. Such is the case of Theodore Schultz's 1959 theory of human capital, who considered that the educational system would bring along higher qualification of the workforce and, consequently, higher production and economic growth, better compensation of workers and better income distribution^{4,13}. To this theory, Frederick Harbison and Charles Myers¹³ added that secondary and higher education per capita was highly correlated with per capita income of a country⁴.

Other relevant theories are those of sociologists Sewell-Hauser and Blaug-Duncan, who point out a

close relationship between parental education and children educational achievements^{4,13}.

There are other theories, such as Arrow's row theory, which states that education does not directly contribute to economic growth, but rather serves as a means for selecting people and assigning them jobs; the certificate devaluation theory, which explains the phenomenon related to a growing need for education for graduates to join the labor market, in relation to employees who are gradually retiring, with a trend to a lower remuneration for the same job; the theory of positional good, which considers that wages are structured according to the nature of jobs and not on the basis of human capital characteristics; the segmentation model, which, like the positional good theory, considers that organizational characteristics are more important than those of the professional for work organization^{4,5,14}; and the assignment and heterogeneous knowledge theories, described by Sattinger (1993) and by Allen and Van Der Valden (2001), respectively, which share the premise that payment is determined by two factors: the subject's educational level and the characteristics of the job position (the difference between both lies in the underuse of knowledge to carry out a job, which is indicated by the assignment theory, but not by the heterogeneous knowledge theory)¹⁵.

There are multiple SGFUPs that have confirmed much of the information described by these and other theories. This study analyzes the sociodemographic, training, employability and satisfaction characteristics among six generations of medical graduates of the National Autonomous University of Mexico Faculty of Medicine (2004-2009).

Methods

The study represents the first analytic phase of the research. Descriptive variables that characterize the study sample of six generations of graduates are described. It is a descriptive, cross-sectional, retrospective, comparative study, with 5295 medical graduates who completed their studies between 2004 and 2009. A questionnaire was prepared with 62 variables related to sociodemographic,

educational, professional performance (work) factors, and satisfaction of the graduates. A pilot test was carried out with a group representative to the one that was studied ($n = 15$), and the semantics and wording of the questions were adjusted with the test results. Its content was validated by eight professors from the Faculty of Medicine with more than 10 years' teaching experience of. Addressing the criterion or construct validity was not considered, since the study is exploratory at its initial stage. A directory of graduates from generations 2004 to 2009 was prepared, with information from the files provided by the Faculty's School Services Office. Subsequently, the questionnaire was sent through email to each of the graduates and a period of 2 months was given for their answer; subsequently, reminders were sent every 2 weeks until completing 8 months in the compilation of surveys. Finally, the physicians who did not answer the questionnaire were electronically asked for an appointment to apply the questionnaire in person, which took approximately 2 more months.

Statistical analysis was performed by means of descriptive and inferential techniques using the SPSS V22 program. The project was approved by the Research and Ethics Commission of the Faculty's Research Division, adhering to the ethical recommendations for research in education of the Ethical Standards of the American Educational Research Association (2000) and the Declaration of Helsinki (2013)^{16,17}.

Results

Of the 5295 graduates, only 1434 agreed to answer the questionnaire (Table 1).

General profile

Gender distribution in the total sample was 59.4% of women ($n = 852$) and 40.6% of men ($n = 582$). Age ranged between 30 and 34 years in 61.6%. During medical training, 93.2% were single, 93.9% had no children; 14.1% worked, and out of them 56.9% did it for between 8 and 20 h a week and 13.4% served 40 h in jobs that were not related to the health area. Transport time of the students to attend their educational activities at the Faculty of Medicine was between 90 and 120 min in 35.4% of the cases.

Educational background

The vast majority of students (97.4%) did not fail years during their basic, middle and higher education (primary, secondary and high school); 93.3% obtained a high school average of between 8 and 9.9 (scale of 5 to 10); 67.2% of students completed the medical curriculum in 6.5 years and 31.9% did it between 1 and 2 years later; 60% of the students did not fail assignments during undergraduate training and 30.8% failed one to two assignments. Regarding the type of main activity carried out at Social Service, 73% served in rural clinics providing medical care to the population. Of the total sample, 86.2% took some medical specialization course and 13.8% did not; 16.3% have Master's degrees and only 2.4% have a PhD.

The most common health institution to study a specialty was the Ministry of Health, with 34%, followed by the Mexican Institute of Social Security, with 29.7%. Only 66.5% of the doctors managed to be admitted to the medical residency system (specialties) on their first attempt, 11.0% on the second, and 6.1% on the third.

Regarding the time elapsed between the end of undergraduate training and being admitted to a medical specialty, 37.9% achieved it immediately and 39.6% did it between 1 and 2 years later.

About 51.9% of physicians stated that they had carried out continuing education activities between 1 and 3 times within previous year, and 22.6% did not. Courses and conferences were the most common continuing education activities (63%); 71.1% of interviewees stated that they had current certification of their medical specialty.

Labor aspects

On obtaining the Medical degree, 72.7% were able to get a professional job in <6 months, 10.3% did it in 6 months to 1 year, and only 2.6% in 1 to 3 years. The factors that were considered most important for being hired were professional performance (32.8%), success on staff selection exam (20.2%), and successful job interview (17.3%).

At the time of the study, 48.7% had a job, 38.5% two, and only 2.9% were unemployed; 44.2% of physicians referred serving in public institutions, 19.9% in private institutions, and 35.9% in both.

The main position that was held was as clinical specialist physician (76%). About 20.3% obtained their

Table 1. Surveyed graduates distribution by generation and gender

Graduation year	Frequency	Percentage	Gender		Total
			Males	Females	
2004	147	10.3	71	76	147
2005	192	13.4	78	114	192
2006	223	15.6	90	133	223
2007	267	18.6	115	152	267
2008	295	20.6	107	188	295
2009	310	21.6	121	189	310
Total	1434	100	582 (40.6%)	852 (59.4%)	1434 (100%)

first job promotion in less than 1 year and 17% in 1 to 4 years; 40.5% have never had a job promotion.

Graduate satisfaction

About 96.9% of interviewees believed that the professional training received at the Faculty of Medicine has allowed them a favorable performance; 56% self-assess themselves as excellent and 43.9% as good. These data support the respondents' claim, who consider themselves successful doctors in 95% of cases.

The most common training elements that doctors refer to apply in their professional practice are presented in table 2.

The graduates stated that the ethical and humanistic bases provided during undergraduate training were adequate for professional practice (Table 3).

About 98% of physicians would recommend the Faculty of Medicine to study Medicine. Regarding the academic staff, 56.5% rated the teachers of the basic area as good and 41.4% as excellent; as for clinical area professors, 57.25% consider them good, and 39.8%, excellent.

The curriculum they studied was considered good by 63.9% and excellent by 32.6%, and 83.5% indicate that it facilitated their insertion into the labor market.

The main strengths of the Faculty were the academic program (26.4%), prestige (27.1%), professors (22%), and clinical fields (18.8%). Its main weaknesses were administrative procedures (30.5%), student conflicts (23.4%), the academic program (10%), and the large number of students in the groups (8%).

Table 2. Elements acquired in graduates professional training

Training elements	Percentage
Timely reference of patients to medical specialties	96.4
Teamwork with other health professionals	94.9
Focus on risk prevention	90.2
Comprehensive medical care	89.8
Care of patient psychological and affective needs	75.2
Usefulness for understanding clinical research	70.7
Usefulness for understanding diagnostic-therapeutic clinical research protocols	67.5
Doctor-patient relationship	67.3
Professional responsibility	66.8
Patient respect and autonomy	59.8
Informed consent	55.0
Handling of medical records	49.7
Usefulness for understanding epidemiological studies	43.3
Medical-legal implications	39.6
Usefulness for understanding social-medical research protocols	17.2

Six generations longitudinal analysis

This section describes the trends observed during the 2004-2009 follow-up period.

Consistently and in average percentage values, 60% of females and 40% of males graduated from medical school; 93% were single and had no children; 14% worked and more than 60% did it between 8 and

Table 3. Trend in the number of years graduates completed medical training

Generation	Time to complete medical training											
	6.5 years		7.5 years		8.5 years		9.5 years		10 years or more		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
2004	120	81.6	26	17.7	1	0.7	0	0	0	0	147	100
2005	139	72.4	47	24.5	6	3.1	0	0	0	0	192	100
2006	157	70.4	45	20.2	18	8.1	3	1.3	0	0	223	100
2007	176	65.9	76	28.5	10	3.7	4	1.5	1	0.4	267	100
2008	189	64.1	88	29.8	17	5.8	1	0.3	0	0	295	100
2009	182	58.7	91	29.4	32	10.3	4	1.3	1	0.3	310	100
Total	963		373		84		12		2		1434	100

Pearson's Chi-square: 53.29; $P \leq 0.0001$.**Table 4. Failed assignments by graduates by generation**

Generation	Number of failed assignments during medical training															
	All passed		One		Two		Three		Four		Five		Six or more		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
2004	98	66.7	33	22.4	9	6.1	2	1.4	2	1.4	0	0	3	2	147	100
2005	133	69.3	24	12.5	23	12	7	3.6	3	1.6	2	1	0	0	192	100
2006	138	61.9	46	20.6	21	9.4	6	2.7	8	3.6	2	0.9	2	0.9	223	100
2007	161	60.3	53	19.8	32	12	13	4.9	7	2.6	1	0.4	0	0	267	100
2008	169	57.3	58	19.7	39	13.2	20	6.8	4	1.4	2	0.7	3	1	295	100
2009	162	52.3	63	20.3	41	13.2	21	6.8	14	4.5	3	1	6	1.9	310	100
Total	861		277		165		69		38		10		14		1434	100

Pearson's Chi-square: 50.31; $P = 0.011$.

20 h a week, with most of them being employees (51.7-67.4%).

At admission to the Faculty of Medicine, the graduates had average grades of 8.9 to 9 in 27.1 to 35% of cases, and average grades of 9.0 to 9.9 in 58.1 to 65.6%, according to the reference generation.

The number of years taken to complete medical training shows a very clear pattern with an upward trend (Table 3). For 7.5 and 8.5 years, the number of students is observed to have significantly increased throughout the considered period (Pearson's Chi-square: 53.29; $p < 0.0001$).

The number students who interrupted their medical training for at least 1 year were very similar in all six generations, around 9.7%. The main reasons why the graduates interrupted their medical training were

economic reasons, presence of some disease and family reasons.

Average percentage rate of passing of all assignments of the curriculum for all six generations was 60%, of failure of one assignment was 19.3%, and of two assignments 11.5%. The difference was statistically significant (Table 4).

Regarding the type of activities carried out on Social Service, medical care in rural-type clinics is observed to have significantly decreased, with a clear and marked trend, from 83.7% in 2004 to 61.9% in 2009 (Chi-square test: 128.009; $p < 0.0001$).

As for the number of medical graduates who completed a medical specialty, the trend is downward, with significant differences being observed, that is, increasingly fewer graduates study some medical

specialty; 98.0% did it in 2004 and 80.6% in 2009 (Chi-square test: 62.420; $p < 0.0001$).

The percentage averages corresponding to the number of attempts made by physicians of the six generations to be admitted to the medical residency system were: 54.3%, one attempt; 33.5%, two attempts; 10.3%, three attempts; and 1.4%, four attempts. The difference was significant (Chi-square test: 77.057; $p < 0.0001$).

The time it takes for physicians to get their first job is observed to have increased. In the 2004 generation, 81.6% did it in <6 months and, in 2009, only 59.7%; however, this difference is not significant (Chi-square test: 30.57; $p < 0.203$).

Discussion

It is important to highlight the difficulty for obtaining the answers from graduates; as it is known, in this type of research, the rate is low¹⁸. This situation was worsened by the fact that, in the 2004 generation, and to a lesser extent in that of 2005, the students did not register their e-mails, a situation that required more time and effort to obtain the participants' responses.

The study confirms something that has been reported by other authors regarding a "feminization" of the medical profession¹⁹, with an average of 60% of women and 40% of men being found. This feminization becomes evident if the results are compared with those published by Flores Echavarría et al.²⁰, from the Autonomous Metropolitan University in Mexico, corresponding to graduates of the 1989 and 1991 generations, where 64.3% of graduates were males and 35.7% females.

Regarding the students who worked during their medical training, an average of 14.1% was observed in all six generations, which contrasts with what was found by the same group of researchers for students who concluded the Social Service year in 2014, with 17.8%²¹. This would appear to indicate that, in recent years, a larger number of students work and study. The University of Rosario in Colombia reported in 2005 that 12.8% of its first semester students worked on their free time; out of them, two students did it daily, which they associated with failing courses²².

Sixty percent of the graduates completed their medical training in 6.5 years without having failed assignments, which is consistent with the observations reported by the same authors for the generation that completed the year of Social Service in 2014²⁰.

In the longitudinal analysis of all six generations, an upward trend was observed in the number of years to graduate. In 2004, 81.6% graduated in the 6.5-year period established by the program, while in 2009, only 58.7% managed to do it, with the number of students who finished in 1 or 2 more years being significantly increased. It should be noted that all the study generations corresponded to the same Single Curriculum that concluded in the 2009-2010 cycle²³.

Another significant finding was the increase in the number of failed assignments by students of the last three generations. Both the increase in the number of years to graduate and the increase in the number of assignments failed per student, mainly in basic cycles, should call our attention on the need to improve the diagnostic admission evaluation, since, as reported by Muñoz et al.²³, there is an important correlation between this evaluation and student academic performance, which constitutes a tool that can and should contribute to avoid school failure.

Graduates' professional profile, as defined in the Faculty of Medicine Single Curriculum, aims to train high-quality general practitioners, capable of timely referring their patients for specialized care, avoiding unnecessary risks; able to carry out curative and preventive actions; in addition to teamwork and comprehensive patient care, considering the affective and emotional aspects of patients, always under strict ethical and human standards²⁴. According to the graduates' answers, most of them considered having acquired these skills; however, a high percentage of them considered not having obtained sufficient knowledge and skills with regard to medical-legal aspects and to the understanding of epidemiological studies and socio-medical research, which generates a great opportunity to have an impact on current curriculum and improve the training of the next generations of physicians.

In this same area of school-related aspects, the gradual decrease in the number of Social Service positions dedicated to rural medical care is evident, which is basically due to two factors: the first one, the increase in the number of schools and faculties in the country, which makes almost all states self-sufficient in the occupation of medical positions for interns in highly vulnerable areas; the second one, the conditions of insecurity that prevail in different regions of the country and that make supervision and surveillance difficult for the authorities and the university itself, as reported by Hamui²⁵.

Regarding the integration of graduates into the labor market, almost two-thirds of the six generations started working as doctors within 6 months, and 10.3% within 1 year, which constitutes highly relevant information, since, according to the report of the Subsecretariat of Higher Education, in 2009, 78% of graduates found work within 2 years¹⁵. In addition, four out of every five graduates were observed to work in the public sector, and only one out of every five does it in the private sector, which corresponds to the social profile of the institutional mission²³. A relevant fact that could be observed in the longitudinal analysis was that, as time goes by, doctors incorporation into the labor market has been slower, and although this variable did not have statistical significance, the fact that, in 2004, 81.6% of the graduates had a job within 6 months, and that for the 2009 generation only 59.7% got it in the same period stands out. Although these data might seem worrying, the percentage of general unemployment that was found was very low (2.9%), which contrasts with other reports, such as the one by Vries et al.²⁶ of 5.7% or the one by Burgos and López¹⁵, who reported on various disciplines, including medicine, up to 14%.

Of note, the physicians of these generations, despite a relatively short time from having graduated, have neglected updating and continuous training, and only a little more than half (51.9%) participated in one to three continuing medical education activities per year, and 22% have not received any type of updating since graduation, which translates into a great weakness in their medical professionalism and in the health system itself²⁶, since continuing medical education is a fundamental pillar of professional practice and a challenge to overcome in the training of future generations.

Conclusions

It is important to have complete student records to improve the Faculty of Medicine Student Support Services Program, as well as to sensitize students on the importance of answering these surveys.

The fact that graduates have an excellent rate of integration into the labor market within 6 months is satisfactory, with a very low level of unemployment and with a high degree of satisfaction with their training and with regard to their university.

It will be highly useful to investigate what is happening in more depth regarding the increase in the number of years and assignments failed in recent generations, in addition to improving the training of

graduates in administrative and epidemiological and socio-medical research areas.

It can also be concluded that none of the theories referred to at the beginning of this manuscript manages to explain the education versus work binomial; it would seem that, currently, the theories of the row, certificate devaluation, psychosocial good, and heterogeneous knowledge are becoming more evident.

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Conflict of interests

The authors declare that they have no conflicts of interest.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this research.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of student and graduate data.

Right to privacy and informed consent. The authors declare that no data on students or graduates appear in this article.

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