

The wastage of doctors in Mexico referred to their formal education and the labor market. Towards the construction of a common methodology

1. Introduction

The medical manpower has been studied from diverse points of view using very varied methodologies and with unequal levels of depth. There are investigations that approach the subject from the formal education standpoint, the problems encountered in the updating of knowledge, the number of human resources, their distribution and proportion for the total national population. There are also inquiries into the working conditions, ethical codes and productivity, among other topics.

In a first revision of the available specialized literature, very few studies were found dealing in a systematic manner with the incapacity of individuals trained in the health field to put into practice the acquired knowledge for the production of services.

In several countries a supply of doctors is being generated, without any planning and, on occasion, any regulation at all. Doctors are being educated in schools or medical faculties that provide them with their professional degree; in spite of this, they will face difficulties to find a job. This problem is about wastage of a qualified labor force, and is related to the market configuration. But there is also another source of wastage during the education process itself which is seen reflected in the behavior of the medicine enrolment schema, in the number of drop outs and in the rates of final efficiency at a national level as well as in the medical education institutions.

Apart from the signs mentioned, the problem of scholar wastage has various facets that are not easy to identify, study and solve. One of these, perhaps the most important, is the enormous economic cost that it represents for a country to spend in an inconclusive economic education process that does not allow the medical students that have dropped out to practice a little or a lot of their acquired knowledge. They represent useless expenses; they are wasted economic resources that no nation can have the luxury of minimizing.

Therefore, human resources are in a constant dynamics between the supply and the requirements of institutions, all of which cause breakdowns that are stated as labor wastage; that is to say, time and capabilities that the trained personnel from educational institutions do not put in practice either directly or indirectly for the production for health services.

One of the central aims of the present study is to carry out an initial exploration of the problem (including the variable gender issue) and to set forth methods to study it in depth. The contents of the study are divided in the following way: after the introduction, the exposition of its objectives is set forth. Immediately after this, a brief framework follows where the main concepts used both for the educational and the labor fields are defined. The following section is dedicated to the first results obtained for the two aforementioned fields. The article concludes with the presentation of the main conclusions of the study that can be useful in the research and analysis of the educational and labor wastage among health personnel, using a common methodology that can be applied in distinct countries.

2. Objectives

- To carry out a general identification of the problem of the wastage of doctors during their education process and in the labor market.
- To begin the construction of a methodology that allows for the study of the problem in Mexico and, at the same time, that can be replicated in other countries, favoring an exchange of experiences orientated toward the search for alternatives.
- To contribute to the discussion of the wastage of human resources in the health sector at the national and international levels.
- During the initial diagnosis about the wastage found in medical personnel, to incorporate the variable of gender to differentiate the dimensions of the problem by sex.

3. Conceptual framework

The purpose of this section is to establish a series of concepts together with their definitions that will integrate the foundations for the presentation of results based on the information gathered. Due to the particularities of each field and for the sake of the exposition, the scholar education and the labor market subjects are addressed separately.

3.1 Wastage during education

In the field of research on higher education at the national and international levels, there a large number of studies that have dealt with the problems of school drop outs, final efficiency, repetition, exclusion, effectiveness and efficiency of the educative institutions.¹ However, in regards to the problem when dealing with specific professions (such as medicine), little has been done to study the problem in an exhaustive way so as to integrate the details of the causes and effects of the wastage of human and economic resources during the education process.

The following concepts have been taken from the results of some of these studies:

School drop outs. It refers to the fact by which the student voluntarily or involuntarily interrupts his/her studies in a definite manner without having totally covered the study plan of his/her respective career. Abandonment is not an isolated act; there are a series of family, social, and institutional factors determining its causality (UAM, 1990).

¹ At a national level, the Centro de Estudios Educativos, A.C. (Center of Educative Studies) and various specialized centres at higher education institutions generated a large written collection on these topics during the decade of the 60's of the XX century. Unfortunately, during the last 10 years, research has gone down in a significant manner.

Among the main causes of abandonment of studies are family approval, economic conditions, study habits, inadequate selection of career, motivation, age, civil state, and employment (Casares, 1994).

Failing. This occurs when a student does not reach the average outcome quality required by the educative institution. The possible causes of failing can be the difficulty of the subject, lack of time to study, an unfair evaluation or a general poor scholar performance related to non academic reasons. When occurring in a reiterative manner, such failing can be an early sign of dropping out (Soto, 2003).

Retention. This refers strictly to actions or policies implemented by an educative institution aimed at encouraging the permanence of the students there. Retention does not only try to achieve the simple presence in the university grounds but also to improve the social and intellectual development of students (Tinto, 1992).

Graduates. Students that have passed the total number of credits or elements that make up the plan of studies, regardless of any institutional or higher norm granting the right of a pass to students with a percentage of credits covering less than 100% (Martinez, 2001).

Final efficiency. This is associated with the concept of quality and efficiency. In an institution of higher education, its measurement depends upon the higher or lower number of students who abandon their studies (Martinez, 2001).

Rate of final efficiency. This is the result of the number of people who graduate from the study program of an institution in a specific year, divided by the number of persons who entered the institution four or five years previously depending on the length of the study program. This rate can be calculated by school year or by the number of years that make up the whole career (Martinez, 2001).

Global rate of abandonment. This is the quotient of the number of persons that did not comply with the timelines and did not complete the corresponding elements to the plan of studies of an institution in a specific year, divided by the number of persons who entered the institution four or five years before (Martinez, 2001).

3.2 Wastage in the labor market

There are different factors affecting the labor market that are difficult to identify and much more to quantify. The issue of unemployment and its varied manifestations in shape and time make it a somewhat polemic topic when dealing with balancing figures. Although on the international level parameters to measure unemployment have been established, this has not enabled to count on timely information that might be comparable among countries and even among regions and states within a country.

In the case of Mexico, the Instituto Nacional de Estadística, Geografía e Informática (National Institute of Statistics, Geography and Computer Science - INEGI) carries out two important activities reporting results on various aspects related to employment at the

national level: every ten years the General Census on Population and Housing is carried out and every three months a National Survey of Urban Employment is taken.

Periodically the INEGI reports a series of facts about the employment situation across the country; one of these is the rate of open unemployment at the national level. However, this rate alone is not the most adequate indicator to establish the dimension of labor wastage, among other reasons because it is a macro indicator that integrates the entire population without distinction of activity and/or profession.

As part of the conceptual and methodological definitions of the present work we propose to calculate the rate of wastage among doctors based on the data on absolute under-occupation plus the number of unoccupied people, as compared to the total number of doctors in the country once subtracted the inactive unavailable personnel and those who are studying for a post graduate degree.

For the purpose of this study, it is convenient to take into consideration the following concepts:²

Rate of open unemployment. This is made up of the population of 12 years of age and over that during the week of the interviews did not have work and had undertaken some action in the two previous months to find a job.

Occupied persons. This is the case of graduates with a degree that work as general practitioners, or of graduates from a residency who are practicing a specialty. The category also comprises those doctors that are dedicated to research and/or teaching activities and those in directive positions.

Absolute qualitative under-occupied persons. These are individuals who have finished their studies and carry out activities completely foreign to their formation which take place outside the health sector (including those dedicated to household activities).

Unoccupied persons. This includes those who are waiting a reply about a job application (and they are not looking for any other job elsewhere), those that are discouraged to continue looking for a job and those who are actively seeking one.

Inactive not available persons. Group of individuals who are retired, pensioned or have permanent incapacity.

Labor wastage. Qualified human resources who do not practice activities related to their education because they are unoccupied or in the group of absolute under-occupied (including those dedicated to household activities)

4. Methodology

² The majority of the definitions have been taken and/or adapted from Frenk J *et al.* (1988).

In respect to the wastage during the years of study, the *Anuario Estadístico* (Annual Statistics Book) published yearly by the Asociación Nacional de Universidades e Instituciones de Educación Superior (National Association of Universities and Institutions of Higher Education - ANUIES) was used as the main source of information. It was necessary to carry out our own calculations to define enrolment, incoming students, graduates and abandonment per group pertaining to a same whole period of study, *with a cohort* of five years each one.

Because there is no information distinguishing the gender of the incoming students, the drop outs and the graduates for the years previous to 1996, it was only possible to calculate rates of abandonment and final efficiency for two graduating classes.

To calculate the wastage in the education of the medical students, the following formulas were established:

$$\frac{\text{Total drop outs per graduating class}}{\text{Total incoming students}} = \text{global rate of abandonment}$$

$$\frac{\text{Total graduates out of a group pertaining to a same whole period of study}}{\text{Total incoming students}} = \text{rate of final efficiency}$$

As to the wastage in the job market, the data base of the *XII Censo General de Población y Vivienda, 2000* (XII General Census of the Population and Housing, 2000) was explored in looking for information about the following variables: gender, age, education and persons who had studied the career of medicine. As to the latter ones, census codes were intersected to find out their activity line (their own or far from their education) and occupation (making explicit if they were dedicated to household activities), and whether they were unoccupied, retired, pensioned or with a permanent incapacity.

Once this information was processed, the following formulas were elaborated. To calculate the rate of employment among persons who studied medicine:

$$\frac{\text{Occupied}}{\text{Total who studied medicine – those studying}} = \text{rate of employment}$$

For the rate of unemployment, the formula used was:

$$\frac{\text{Unoccupied + dedicated to household activities + inactive unavailable}}{\text{Occupied}} = \text{rate of unemployment}$$

And for the rate of wastage it was established that:

$$\frac{\text{Absolute under-occupied + unoccupied}}{\text{Total who studied medicine - those studying - inactive unavailable}} = \text{rate of wastage}$$

5 Results

5.1 Wastage during education

In general, enrolment in the career of medicine in Mexico has shown a non linear behavior. It was at the beginning of the decade of the nineties when it showed a trend to drop, mainly because of the official policy that looked for a way to halt the high demand that was evident at that time. However, in absolute terms it has increased in 13,163 students during the period of 1990 – 2001 (see table 1).

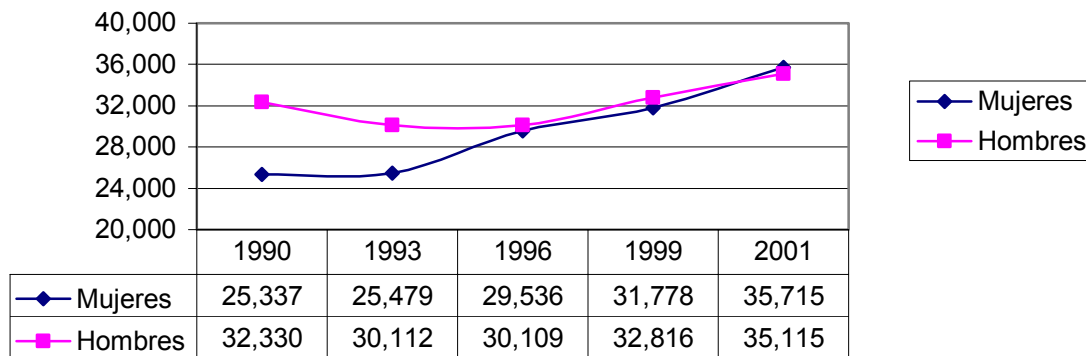
Table 1. Total enrolment for the degree in Medicine in Mexico, 1990 – 2001

Year	Total
1990	57,667
1993	55,591
1996	59,645
1999	64,594
2001	70,830

Source: ANUIES, *Anuarios estadísticos, 1990-2001*

Throughout the mentioned period, the proportional participation of women maintained a constant growth. According to the annual statistics book from the ANUIES, the percentage of women enrolled in medicine went from 43.9% in 1990 to 50.4% in the year 2001. It was in the year 1999 when the women enrolled outnumbered the men for the first time by the number of 1, 038 students (see figure 1).

Figure 1. Total enrolment in the career of medicine by sex, 1990-2001



Source: ANUIES, *Anuarios estadísticos, 1990-2001*

To calculate the rate of abandonment in the career of medicine, a series for each graduating group from the first admission in 1977 up to the graduating class of 1997-2001 was constructed. Having the complete series it could be established that it was in the period of 1985-1989 where the lowest rate of drop outs (or wastage) was found, with a rate of 165.0 x thousand students, while the highest rate of drop outs (wastage) was registered in the graduating class of 1990 – 1994, with a rate of 493.5 (see figure 2).

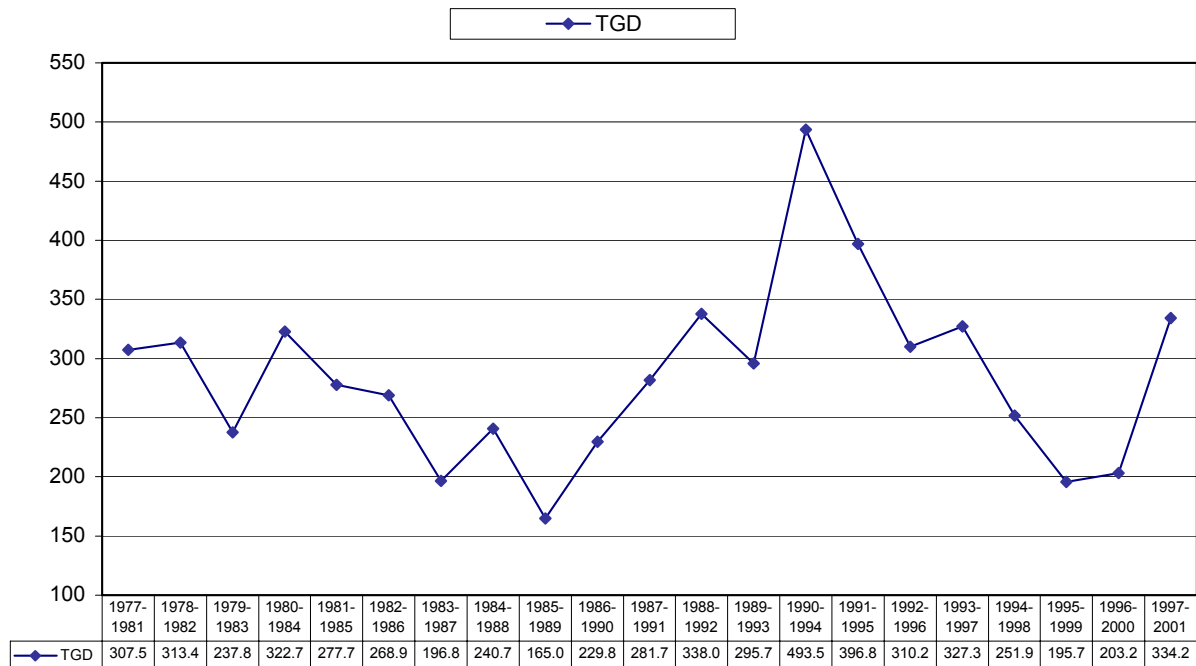
Throughout the series it was not possible to observe a homogeneous behavior since ups and downs were registered from one graduating class to another with no linear behavior. For example, in the graduating class of 1978 the rate of drop outs was 313.4, while for the following graduating class it was 237.8, making a difference of 75.6 points. Specific studies would be required to find a logical explanation for such behavior, which without a doubt could contribute to a better knowledge of the problems of wastage displayed in the number of school drop outs.

Another indicator that allows us to observe the wastage is the rate of final efficiency in the career of medicine at the national level. In the same manner, the series of graduating classes with the same cohort was constructed and it was seen that the greatest final efficiency was achieved in the graduating class of 1985 and that of 1995 with a rate of 834.9 and 804.3, respectively. Ten years had to go by to come close to the highest rate during the period of 1977 – 1999 (see figures 3 and 4).

Although it is true that the final efficiency varies from one medical school to another (which also would be important to investigate more deeply), there is no doubt that at the national level, the registered rates are worrisome, given the wastage of human resources that do not conclude their studies.

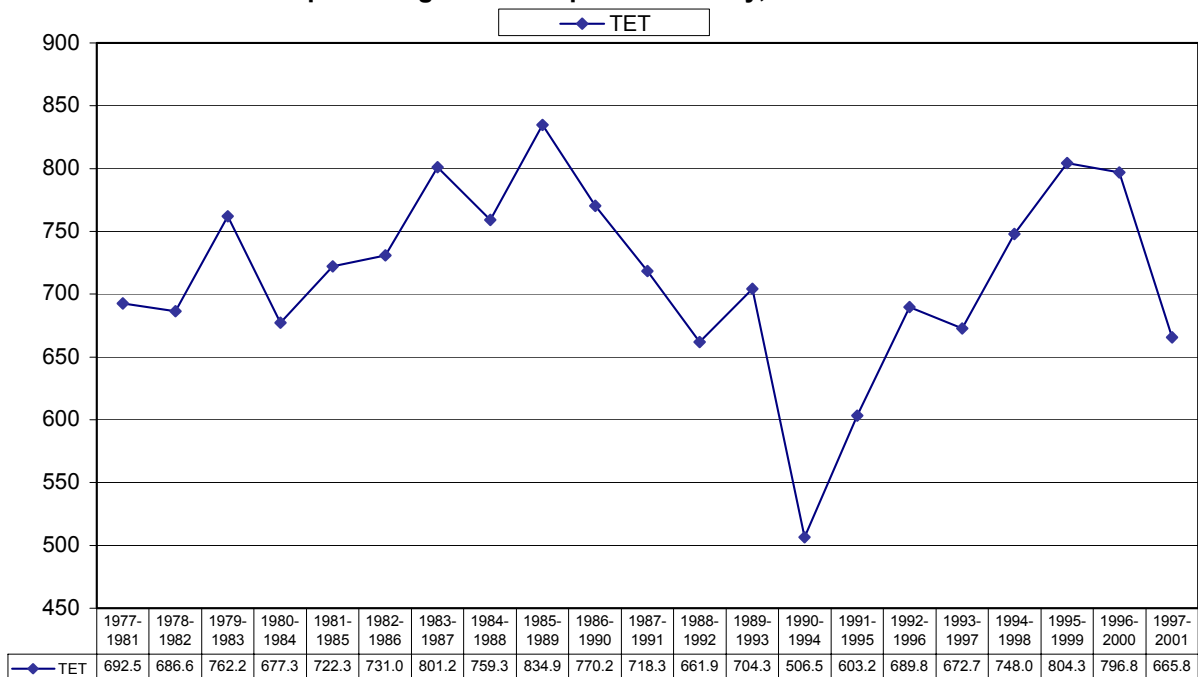
On the other hand, the proportion of incoming students as opposed to the total graduates of medicine in Mexico during the period of 1977 -2001 was calculated. The result for the first year was 21.9 and for the second it was 21.8. The resemblance between these two years is peculiar because nothing similar is observed in the remaining years of the period; sometimes the proportion went down (13.9 and 14.0 in 1986 and 1982) and some other times it went up, as in the years of 1997 and 1998 with 23.6 and 23.3, respectively (see figure 5).

Figure 2. Global rate of abandonment (GRA) in medicine by group pertaining to the same period of study, 1977-2001



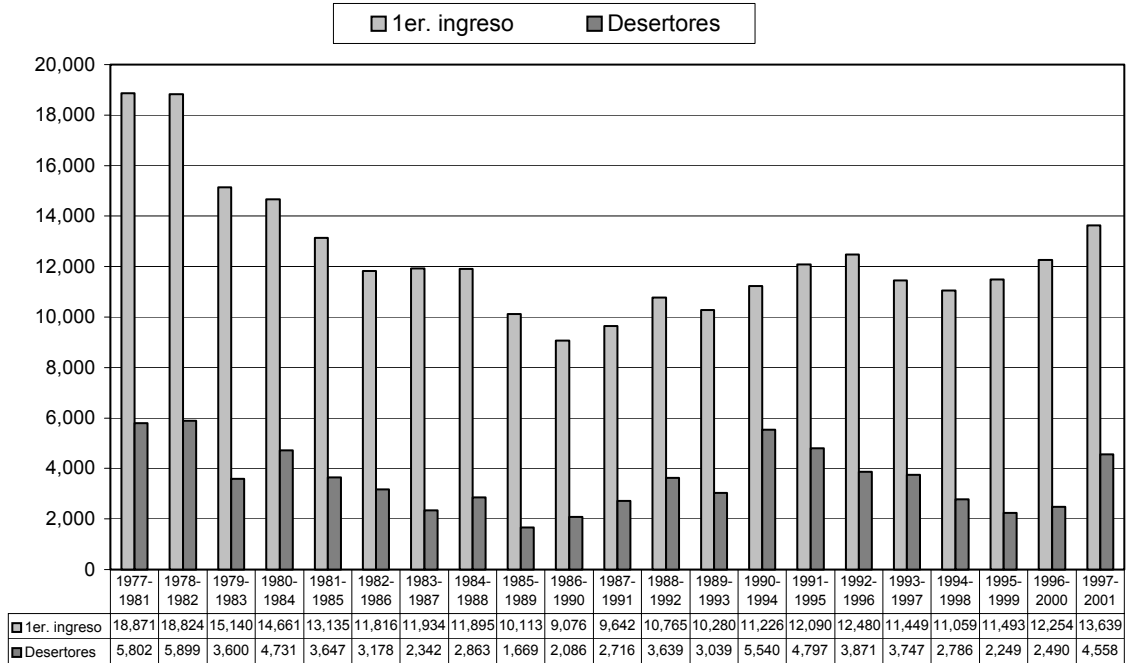
Source: ANUIES, *Anuario estadístico, 1977-2001*

Figure 3. Rate of final efficiency (RFE) x thousand students by group pertaining to a same period of study, 1977-2001



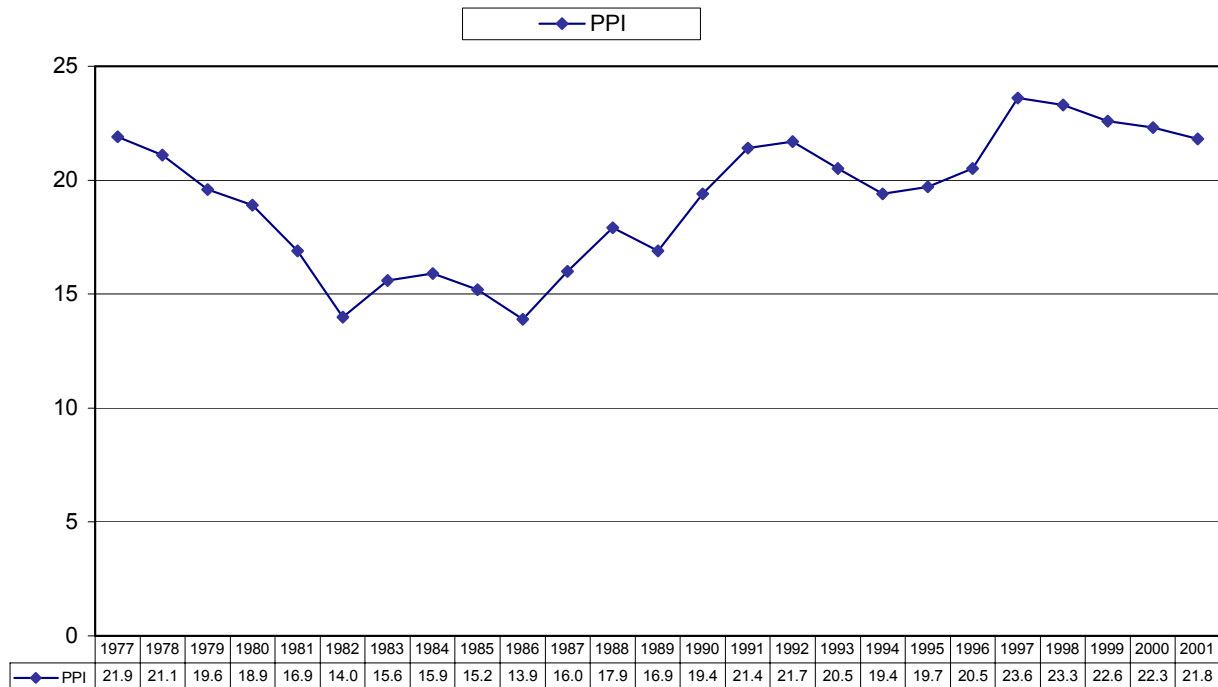
Source: ANUIES, *Anuario estadístico, 1977-2001*

Figure 4. Incoming students and drop outs by group of the same period of study, 1977-2001



Source: ANUIES, *Anuario estadístico, 1977-2001*

Figure 5. Proportion of incoming students (PIS) in regards to total enrollement in medicine, 1977-2001



Source: ANUIES, *Anuario estadístico, 1977-2001*

As can be seen in Table 2, the information about drop outs, graduates and final efficiency by gender does not show any significant differences. However, given that it was only

possible to obtain information by gender for two classes pertaining to the same period of study, it would be difficult to reach any final conclusion in this respect.

Table 2. Global rates of abandonment and final efficiency of the medical graduates x each thousand students by sex and groups pertaining to the periods of study 1996-2000 and 1997-2001

Groups of a same period of study	Incoming students		Drop outs		Graduate students		Global rate of abandonment		Rate of final efficiency x thousand students	
	M	W	M	W	M	W	M	W	M	W
1996-2000	6,200	6,054	1,390	1,100	4,810	4,954	224.2	181.7	775.8	818.3
1997-2001	6,819	6,820	2,215	2,343	4,604	4,477	324.8	343.5	675.2	656.5
1998-2002*	7,456	7,064	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Source: ANUIES, *Anuario estadístico, 1996-2001*

* There are no available data for the year 2002

Upon constructing series of data by year, it was found that women have moved from representing 19% of the graduate students in 1970 to almost half of the graduate students in the year 2001 (49.3%). Since the year of 1996, the number of graduate women from medicine has been very similar to that of men. Something similar occurs when comparing the information about incoming students and drop outs (see table 3). The number of graduate students who received their degrees has not shown big changes in the recent years: in 1996, 45.9% were women, a figure that went to 49.3% in the year 2001.

Table 3. Incoming students, drop outs and graduate students in the medical career by year and sex, 1996 -2002*

Year	Incoming students		Drop outs		Graduate students	
	Men	Women	Men	Women	Men	Women
1996	6,200	6,054	1,731	1,914	4,469	4,140
1997	6,819	6,820	2,880	3,057	3,939	3,763
1998	7,456	7,064	3,293	2,954	4,163	4,110
1999	7,331	7,248	2,706	2,629	4,625	4,619
2000	7,655	7,858	2,845	2,904	4,810	4,954
2001	7,501	7,962	2,897	3,485	4,604	4,477
2002	7,746	8,631	n/a	n/a	n/a	n/a

Source: ANUIES, *Anuario estadístico, 1996-2002*

* There are no available data for the year 2002

5.2 Wastage and the job market

From the total of general physicians in 2000, 50% were working in the medical area, 7% were unoccupied, and 18% were studying. Considering things under the focus of gender, 6% of the group of men was not working and 9% of the women were inactive, while the percentage of men and women working in medicine was 55.6% and 41%, respectively; that is to say, there was a difference of 14.6 points in favor of the number of men employed.

Of the persons with an education in general medicine that were dedicated to household activities, only 0.1% were men while 13% were women. Another piece of information that stands out is the one regarding the personnel who are inactive and not available; in fact, there are more men than women as such, which can indicate that there are fewer women retired and pensioned (see table 4).

Table 4. Occupational status of the general physicians by sex, 2000

	Total	%	Men	%	Women	%
Total nations	237,424	100	144,118	100	93,306	100
Occupied (working in its own study area)	118,662	50.0	80,211	55.6	38,451	41.0
Still studying	42,822	18.0	20,531	14.0	22,291	24.0
Unoccupied	16,744	7.0	8,478	6.0	8,266	9.0
Absolute under-occupied	52,266	22.0	29,403	20.4	22,863	24.5
- Dedicated to household activities	12,395	5.0	133	0.1	12,262	13.0
- Working in activities foreign to their own filed	39,871	17.0	29,270	20.3	10,601	11.5
Inactive non available	6,930	3.0	5,495	4.0	1,435	1.5

Source: Data generated by FUNSALUD from the *XII Censo General de Población y Vivienda, 2000* (XII General Census on Population and Housing, 2000).

Based on the definitions set forth in the framework for this work and the formulas set out in the methodology section, the following results for the total of the medical personnel were obtained.

Rate of employment:

$$\frac{118,662}{237,424 - 42,822} = 609 \text{ x thousand doctors}$$

Rate of unemployment:

$$\frac{16,744 + 12,395 + 6,930}{158,533} = 303 \text{ x thousand}$$

Rate of wastage:

$$\frac{52,266 + 16,744}{237,424 - 42,822 - 6,930} = 367 \text{ x thousand}$$

When carrying out the same operations, but taking into account the variable of sex, the results obtained were the following:

Rate of employment:

$$\frac{38,451}{93,306 - 22,291} = 541 \text{ x thousand doctors}$$

Rate of unemployment:

$$\frac{8,266 + 12,262 + 1431}{38,451} = 571 \text{ x thousand}$$

Rate of wastage:

$$\frac{22,863 + 8,266}{93,306 - 22,291 - 1,435} = 447 \text{ x thousand}$$

On the other hand, when exploring for further details on the age of those persons that claimed not to be working at the moment of the census, it was found that the highest percentage corresponded to the age group of 20-29 years. Within this group, once incorporated the gender perspective, 60% were women and 49.5% were men. If the two initial age groups (from 20 to 39 years of age) are considered, the figure for the women goes up to 72% (see table 5). An initial conjecture about the reason for this high percentage of women that do not work (more than 70%) is that they are in their reproductive years.

Table 5. General physicians who do not work, by age groups and sex, 2000

Age groups	General physicians			
	Men	%	Women	%
20 – 29	4,200	49.5	4,897	60
30 – 39	621	7.7	977	12
40 – 50	674	7.8	953	11
Other groups	2,953	34.8	1,439	17
Total	8,478	100	8,266	100

Source: Data generated by FUNSALUD base don the *XII Censo General de Población y Vivienda, 2000* (XII General Census on Population and Housing, 2000).

6. Conclusions

- Although there is little evidence to diagnose the phenomenon with precision, it can be claimed that in Mexico the wastage of human resources in the health sector is a reality. This represents a crude paradox as we face the need for more human resources in the outreaching areas and for the population who live in extreme poverty.
- The wastage of highly qualified man power without a doubt has a negative effect on the economy of any country. Governments and families invest huge amounts of material and financial resources to develop professionals who cannot be placed on the job market and as such cannot carry out the functions for which they were educated for long periods of time.
- As part of the problem, the experience which individuals have to face to fully incorporate themselves into the job market as well as the barriers and opportunities to get a job have to be taken into account. Finally, the health systems, including their educative components, have to look for ways to reduce the wastage in order to increase the efficiency of the system as a whole, and this should be considered as a social imperative.
- Unemployment and the rate of wastage among women are very much above the average of both genders. This summarizes an unequal work situation which is added to a series of disadvantages that are not easy to explain; for example, in general terms men receive higher incomes for doing the same job as women, and the directive positions are usually assigned to them.
- The wastage of resources during the education of medical students is significant as was shown in the results. This problem should be studied in detail enabling us to arrive at an estimation of the economic cost that this presents at the individual, family and social level.

- In Latin America and in Mexico, the wastage of human resources in the health sector is a problem that has not been studied deeply and to which no institutional answers been found.
- The methodology followed to calculate the wastage in education as well as in the labor market showed to be adequate to support these kinds of tests. Then, based on the information from population census and the management of similar variables, it would be possible to replicate this method in other countries, trying to carry out comparative and complementary studies that allow us to know the problem in more detail and to assist in the formulation of alternative policies within the health sector.
- Such methodology can be applied without further difficulties in the exploration of the situation that prevails in the development and labor conditions of other occupational categories such as nursing and dentistry.

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