



(RESEARCH ARTICLE)



## Estimation of the dental chair-hour cost in the Faculty of Dentistry of the University of Cuenca

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### Abstract

**Objective:** Determine the dental chair-hour cost in the Faculty of Dentistry clinic of the University of Cuenca.

**Materials and methods:** This is an analytical-observational research study in which the use of different formulas was applied to calculate the dental chair-hour cost in each attention given by the students of the Faculty of Dentistry of the University of Cuenca, through the information obtained from administrative data collected by the institution, taking into consideration the 95 dental chairs within the faculty.

**Results:** The dental chair-hour constitutes a value of 3 dollars and 6 cents, an approximate result that can be influenced by different variables within the Faculty of Dentistry of the University of Cuenca such as the use of the internet, security service and materials used in each treatment.

**Conclusions:** Knowledge of the dental chair-hour cost is important within a School of Dentistry, to be able to have a specific minimum reference to be charged that must be respected, so that resources invested are not lost, rather get the most out of them.

**Keywords:** Dental Offices; Office Management; Economics, Dental; Health Services; Cost Analysis

### 1. Introduction

When opening a dental office, one of the most important steps to be able to manage our clinic successfully is to carry out an analysis and cost system in order to determine the value to be charged for the different dental services offered.

In the dental consultation, the time spent may vary between patients, since the same type of services are not always offered. The patient may require from simple treatments to complex treatments that demand much more time, for this reason it is important to know the dental chair-hour cost, since it would allow us to determine a fair price for both the patient and the professional.

Currently, most professional dentists do not know how to estimate the cost per dental-chair hour in their dental office, and they do it empirically or randomly, so that consequently their economy may be affected. A great disadvantage is that there are very few studies that guide the professional when opening his office. Likewise, in a School of Dentistry where students carry out their internships, many times no type of calculation is applied that allows them to establish a minimum value to be charged for each service according to the resources used.

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To determine the cost of the dental chair-hour, the fixed and variable costs must be added and calculated per hour of dental care, for this reason, it is necessary to know how to identify them [1].

Fixed costs are those that do not vary, regardless of the number of patients who come to the dental consultation, for example, human resources, equipment and instruments purchased, or rent of the office. However, it must be considered that the latter may vary depending on the location and clinic size [1]. Variable costs are those that can increase or decrease according to the size of production or level of activity, for example, dental supplies, basic services and general services, such as waste disposal and taxes [1].

To calculate the fee for each member of the office, the following formula is used:

$$H.C.RR.HH = M.S / W.D.M / D.S.H$$

- H.C.RR.HH: Hourly cost of human resources.
- M.S: Monthly salary.
- W.D.M: Working days per month.
- D.S.H: Daily service hours [1].

To calculate the cost per hour of equipment, instruments, furniture, infrastructure, etc., its initial cost and its depreciation time must be considered, the latter can vary between 10% and 16%.

$$C.H.E.I.F.I.F.O = P.P / M.D / W.D.M / D.S.H$$

- C.H.E.I.F.I.F.O: Cost per hour of equipment, instruments, furniture, infrastructure and others.
- P.P: Purchase price.
- M.D: Months in which it is depreciated.
- W.D.M: Working days per month.
- D.S.H: Daily service hours [1].

To calculate the hourly cost of the services, the use or consumption of each one per month must be considered:

$$H.C.S = M.C.F / W.D.M / D.S.H$$

- H.C.S: Hourly cost of services.
- M.C.F: Monthly consumption form.
- W.D.M: Working days per month.
- D.S.H: Daily service hours [1].

To calculate the dental chair- hour cost, the following formula can be used:

$$DC.H = (fixed\ costs + variable\ costs + annual\ return) / (W.D.M * D.S.H)$$

The annual return is calculated with values between 8%, 10%, 12%.

- DC.H: Dental chair-hour.
- W.D.M: Working days per month.
- D.S.H: Daily service hours [1].

Therefore, the objective of this study is to determine the dental chair-hour in the Faculty of Dentistry clinic of the University of Cuenca.

## 2. Material and methods

The present article is an analytical-observational research study in which the different formulas previously described will be applied to calculate the dental chair-hour cost in each attention given by the students of the Faculty of Dentistry of the University of Cuenca. The data belonging to the year 2021-2022 were collected from the administrative staff of the Faculty of Dentistry of the University of Cuenca, organized and tabulated in a Microsoft Excel sheet. In the development of the study, the 95 chairs distributed in the different dental care areas were considered, such as

prosthodontics, dental aesthetics, surgery, endodontics, periodontics, diagnosis and emergency, pediatric dentistry and orthodontics. For this, 35 teachers in the clinical area were considered in the study, along with the days and hours of weekly attention of each teacher according to the schedules published by the faculty. In addition, within the calculation, the cleaning service was added according to the hours and days worked per month. Within the equipment and instruments, only the dental chair and the cavitron were considered, which are the basic essentials in each dental care. Additionally, an average of water and electricity consumption was made for the last 12 months available to knowledge, which correspond to the year 2021.

### 3. Results and discussion

**Table 1** Fixed costs

Hourly cost of human resources	611,3358
Equipment cost per hour	0,104167
Cost per hour of instruments	0,046296
Total	611,49

The total fixed cost is 611.49 after considering the human resources, equipment and instruments used in the faculty.

**Table 2** Variable costs

Water	0,007549474
Electric power	0,036163158
Housekeeping	0,108499342
Total	0,152211974

The total variable cost is 0.15 considering the basic services of water, electricity and cleaning.

**Table 3** Dental chair-hour cost

Fixed costs	611,49
Fixed cost	0,1522
Annual return	8%
Working days per month	20
Daily service hours	10
Total	3,058211

The dental chair-hour cost is 3 dollars and 6 cents, which indicates that it is a considerable value since the simplest treatment in the faculty consists of a diagnosis that has a value of 3 dollars. For this reason, no treatment that requires the use of the dental chair should cost less than the value of the dental chair-hour.

However, the value charged to the patient is still low compared to the resources that were not considered for the calculation of this study, such as internet use, security service and materials used for each treatment. This is why each treatment must have a different cost depending on the materials used.

Nevertheless, the value charged is prudent if we know that the Faculty corresponds to a public educational institution and the majority of patients go to it both, because it is recognized for its low treatment prices and because of the collaboration with the students who are carrying out practices. In addition, it is worth mentioning that many times these

treatments are paid by students to fulfill their various requirements and the patient does not have accessibility or the necessary financial resources.

All professionals must value their job, charging a fair value for the work done; so, it is important to seek advice when starting a job, for example, in the case of the dentist when establishing a dental clinic. In a study carried out by Aguilar F. et al. [2], where the economic impact for the dentist was quantified by carrying out diagnoses at no cost, one of the conclusions reached was that not only a negative economic impact is generated, but also a negative psychosocial impact, since a decrease in income means a lifestyle different from what is expected or wanted.

The cost analysis is an instrument to support the management in the planning of the services, it constitutes an evaluation to determine how the resources have been spent. It allows to identify areas where expenses can be reduced, where further analysis is required and where cost increases are justified [2]. A cost does not only represent what is spent on materials and workers, it also implies expenses on basic services, premises, equipment, among other things. Each resource that is used during the production and sales process, is associated with a cost, which we must determine [2]. Similarly, the calculation of depreciation suffered by machinery and equipment must be considered. In a study carried out by Madrid C. et al. [3], where the objective was to determine the costs of unit services in the Dental Clinic, it was observed that in 4 of 10 activities, the rates were below the costs.

Through the costs the profitability of the company can be analyzed, a cost analysis allows to examine the investment and its management, in order to increase income, reduce resources invested, scrutinize new opportunities and solve possible problems. In the same way, this analysis allows to establish optimal prices, activating the level of competitiveness and the increase of the liquidity and profitability indexes [3]. Bedoya L. et al. [4] after carrying out a cost analysis for the dentistry services in the city of Tulua, pointed out that in the dental consultation, 49.72% of the costs are concentrated in direct labor, 48.49% in the indirect labor and 1.79% in raw materials or supplies.

Mori JC. [5] states in his thesis that the production costs of a company must be known, since in this way profits and losses can be recognized; while, if the costs are unknown, an administration will be handled empirically, and may generate financial losses.

It is important to consider that in this article certain limitations are presented, such as the lack of a specific device to measure the electricity service for each dental chair. In addition, it was not considered the use of the Internet, the cost of the security service and the materials used, so the dental chair- hour cost will vary depending on the treatment applied in the patient.

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#### **4. Conclusion**

At the end of this study, it was concluded that the dental chair-hour cost charged at the Faculty of Dentistry of the University of Cuenca is a favorable minimum price according to all the supplies used in each dental care and profitability of patients and students. However, this value can be influenced by various limiting aspects of the study, such as the use of the Internet, security service and materials used in each treatment. It should be emphasized that this value must be respected in each dental care within the Faculty of Dentistry of the University of Cuenca to have a specific minimum reference, so that resources invested in the education of students who carry out the practices are not lost, better to get the most out of them. Additionally, knowledge of the dental chair-hour cost is applicable to future professionals who wish to set up their own dental office.

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#### **Compliance with ethical standards**

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##### *Disclosure of conflict of interest*

There were no major conflicts of interest during the performing of this article.

##### *Statement of ethical approval*

The present research work does not contain any studies performed on animals/humans subjects by any of the authors.

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