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New Models of Financial Management Put into Effect in Dental Practices in Romania – Empirical Study

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***Abstract*—**20 years of dentistry was a period of transition from communist to market economy but Romanian doctors have insufficient management knowledge. Recently, the need for modern management has increased due to technologies and superior materials appearance, as patient's demands.

Research goal is to increase efficiency by evaluating dental medical office cost categories in real pricing procedures.

Empirical research is based on guided study that includes information about the association between categories of cost perception and therapeutic procedures commonly used in dental offices.

Due to the obtained results to identify all the labours that make up a settled procedure costs were determined for each procedure. Financial evaluation software was created with the main functions: introducing and maintaining patient records, treatment and appointments made, procedures cost and monitoring office productivity.

We believe that the study results can significantly improve the financial management of dental offices, increasing the effectiveness and quality of services.

***Keywords*—** costs, financial methods, management.

I. Introduction

In the process of privatization that began 20 years ago, there was a transition from communist organization to a market economy. Dentistry in the last 10 years has adopted modern information tools and management activity has expanded considerably. At the moment, dentists in Romania have three problems: 4 times increase of the number of dentists in the last 15 years, decreasing the purchasing power of the population due to poor professional organization and crisis that prevents obtaining reasonable funds for oro-dental health from the social health insurance system which is a Bismarck type. Equipment developed at last moment standard and their use in dentistry, as well as increasing the number of materials has brought the necessity of fluently productive activities with logistics which targets manufacturer-supplier-seller chain.

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A nationally representative study in Romania, made in 2011, shows that, although 68% of doctors have never attended a management course in dentistry, 85% of respondents agree that they should increase the efficiency of the dental office. 35% of dentists in Romania do not use management tools, and 38% say that they have never made an estimate of the budget office, but they keep track of receipts.

For the question: on what policy are your prices based? 48% said they fix prices based on competition, and 14% change the price according to the patient.

In the same survey, for the question: Do you have a informatic management system in your dental office?, 40% of respondents declare that they have no informatic management program and 37% manage their medical information based on the patient, without using this system to order or to manage the materials needed in the dental office, and only 24% use a computer system to manage appointments.

An U.S. study found that by introducing a data storage system it reduces the amount of paper used, it reduces time to access the old files and it can index files for easier archiving [1].

The study accomplished by the University of Maryland presents Electronic Patient Record (ERP) which includes: quality indicators (necessary for comparative analysis of quality assurance in terms of patients but also medical staff) providing information support for the establishment diagnosis, providing administrative functions of information management in exchange of clinical data (including telemedicine). This system is useful for both medical staff but also to educate students, new employees or patients. It also offers information on costs, productivity, procedures and how to apply them. Another positive aspect is that the system is receiving data also by dictation, the doctor being able to dictate at the same time, ensuring all is stored about the performed procedure [4].

The same issues are presented by a study in American Dental Association (ADA). It states that electronic records will dramatically affect the dentists work and by digitization of information we are passing from the clinical education to the continuing medical education and from the classic management tools, such as payments to electronic commerce and marketing.

The market of these programs dedicated to dental offices is growing, especially in Anglophone countries. Competition is

fierce, data indicating that the main competitors are Dentrix, Softdent, Practiceworks and Eaglesoft.

ADA applies periodic market research to determine the views and needs of its members. This way they have the following data: 38% of physicians are interested in assessing the costs of their dental offices and 37% wants to provide better oro-dental education to their patients, including regular visit to the dental office. The same study determined that 51% of doctors want to introduce an informatics system in their office [7].

In a U.S. study, which was also explored by ADA, was identified the connection between increasing price in medical offices, dentists revenue growth and increased market prices in general. The authors use consumer price index (CPI) calculated in the last 30 years and have observed a correlation between this index and the variation of services prices and income for a dental medical office [2].

A conducted exploratory study made by the Department of Medical Dentistry at the University of Pittsburgh in 2004 was realized to determine how dentists use their computer in daily practice. The study group was randomly selected and consisted of 1159 respondents. They responded in a percentage of 24.6% that they have a computer near dental units and 13.1% have no computer in the office. Those who use a computer had a program dedicated to dental office installed. The program is mainly used for keeping medical records and in this context especially for appointments and treatment. Other uses are for integrating digital images, educating patients and improving reception activities [5].

In Germany, the Institute for Quality and Efficiency in Health Care provides evidence based on function evaluation, benefits and costs of health services, including dentistry [6].

II. Aim And Objectives Of The Study

This study aims to increase the efficiency of dental office by evaluating price categories for establishing the real price procedure.

The study goals are: to establish all component procedures for procedures, to establish the costs of procedures by adding the costs of procedures; proposals of financial approach in dental office, according to dental specialties.

III. Materials And Methods

This study was conducted using as a tool a questionnaire that was gaved to a representative sample of doctors for Romania.

The tested population was represented by dentists that own dental offices in major urban centres according to the database obtained from the National Dental College from Romania. Sampling is random, stratified and representative for the tested population including 273 doctors of the 16,000 dentists practicing in 11,000 dental offices in Romania.

We conducted a study that is part of an exploratory research, which define key variables and assumptions of a research to determine the coordinates of a process or economic phenomenon.

Interviewers moved in the field and applied the investigation directly, through face-to-face dialogue, to the persons included in the study sample.

Associated questionnaire with this type of research included categorical responses, consisting of 18 questions approached in a logic ascending sequence and was divided into two categories: questions to identify respondents (first 11 questions) and questions to test scientific hypotheses issued (questions 12 to 18) [3].

At the synthesis questions we followed achieving ensemble general images of testing the understanding the basic financial concepts, coupled with the main procedures commonly practiced in respondents' dental offices. Responses were analyzed separately for each labour therapeutics in part.

The questionnaire will not be detailed in this article because questions can be deduced in the results chapter.

IV. Results

The results of this study shows that 71% of dentists questioned practice dentistry for over 10 years and in the same percentage they have dental office for over three years, so most have professional experience in this field.

42% of doctors have offices with a turnover between 60,000 and 120,000 Euros/year, while only 8% have offices with turnover over 500,000 Euro/year, characteristic that indicate a dental clinic.

It shows that 57% of respondents have a single dental unit in their dental office and only 13% have between 3 and 5 dental units, characteristic of dental clinics.

72% said their average are over 5 patients per day per dental unit and 73% said that one doctor is working on dental units per day.

Working with other doctors is null for 48% of respondents, while 39% work with 2 to 4 doctors, 13% work with 4 to 10 doctors and none of the respondents collaborates with over 10 doctors.

It is unfortunate that 18% of respondents say they have no dental assistant as an employee and 38% have no auxiliary employees (accountant, receptionist, maintenance or repair technician for the office equipment, etc.), while 72% have at least one dental assistant and 29% have employed between 2 and 4 auxiliary staff.

As general dentists, the range of basic procedures performed in the office is complete: consulting, preventive, restorative therapy and prosthetic crown. Endodontic and emergency treatments are practiced by 98.7% of respondents, 75% of them practice surgery, implantology by 39% and orthodontics by 31.6%. Only 7.6% have other activities, such as the didactic.

As methods to improve remunerative or profitability of dental office, 55% prefer increased marketing, 38% choose charges growth, 32% want activity development, 29% will reduce the overall overheads, 15% would reduce spending on materials and 8% of those with staff.

Only 30% of respondents in this study said they had attended management training.

In terms of correlations between categories of costs or spendings and their relevance in achieving specific therapeutic procedures in the owned dental office the following results were obtained and were analyzed separately for each labour.

Responses were designed in the form of matrices in which on the lines were placed the eight most common therapeutic procedures and in the column were framed the major operating expenses in dental offices (sterilization and protection materials, dental materials, instruments wear, dental equipment wear, physician labour, assistant labour, staff labour, utilities, administrative expenses, etc.).

For a consultation doctors consider relevant for obtaining the final price the following categories of costs: 57% use of sterilization and protection materials, the work performed by the physician 52%, 48% and 47% instruments wear respectively the utilities, 44% for administrative expenses and others, 39% for dental equipment wear and about 22% for dental assistant labour, support staff labour and dental materials used.

For oral hygiene procedure, the costs forming the final price are presented in Fig. 1 and they are expressed in percent.

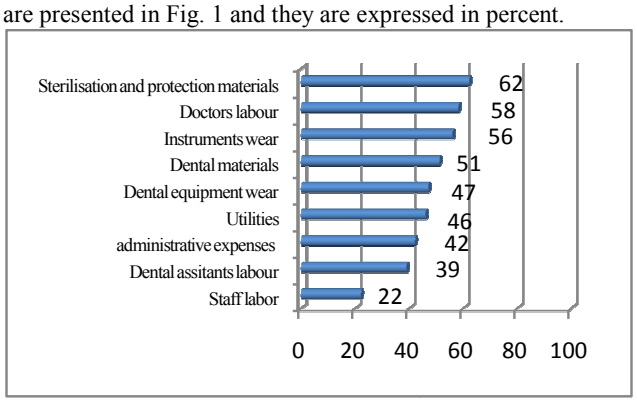

Fig. 1 Costs for oral hygiene procedure

In terms of "tooth crown restorative treatments" procedure the following expenditures were specified by respondents: 66% for doctors labour and dental materials, 62% for sterilization and protection materials and for instruments wear, 56% for dental equipment wear, 46 % for dental assistants labour and utilities, 43% for administrative expenses and other labours and only 18% for staff labour.

For endodontic the following expenditures were ranked in order of weights scores: 65% for dental materials and for doctor`s labour, about 55% for sterilization and safety materials, equipment wear and dental instruments wear, 44% for utilities, administrative expenses and dental assistants labour and again, only 19% for staff labour.

For emergency treatment the following expenses are classified in the order of the weights obtained from the respondents: 60% for the doctor's labour, 55% for sterilization and protection materials, 45% for dental materials and instruments wear, 42% for utilities, dental equipment wear and administrative expenses, 37% to dental assistants labour and 18% for support staff labour.

For prosthetic expenses we obtained from the respondents the following weights: 66% for dental materials and doctor's labour, 62% instruments wear, sterilization materials and protective equipment and dental equipment wear, 44% for utilities, dental assistants labour and administrative expenses and 20% for staff labour.

In case of surgical procedures the following expenses are classified in the order of obtained weights: 66% and 61% for sterilization and protection materials as well as for the doctors labour, 56%, 53% and 51% for instruments wear, utilities and dental materials, 48%, 46% and 42% for dental equipment wear, for dental assistants labour and respectively for administrative expenses and and only 24% for staff labour.

For the implantology the following expenses are classified in the order of obtained weights: 58% and 55% for dental materials and for doctor's labour, 52% for sterilization and protection materials and for assistants labour, 48% for the instruments wear and utilities, 45% dental equipment wear, 42% for administrative expenses and 26% for staff.

For orthodontics the costs forming the final price are presented in Fig. 2 and they are expressed in percent.

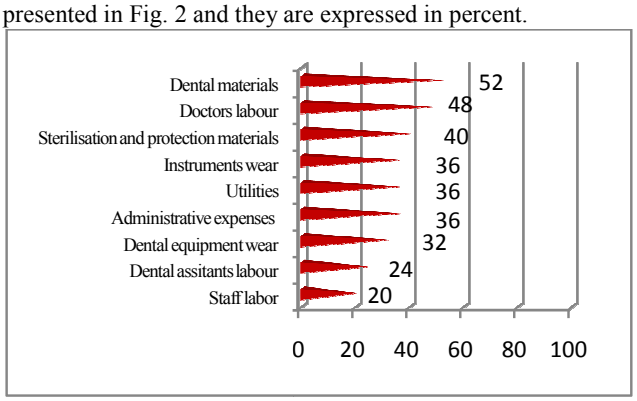

Fig. 2 Costs for orthodontics procedure

We`ll detail as an example of cost calculation methods for consultation and for dental treatment performed in a dental office in Romania.

Example 1: Primary Consultation

Goals - diagnosis, patients file, establish treatment plan

Spent time - usually 10 minutes is sufficient

Difficulty - very low

Due to the low difficulty this "treatment" is identified with a therapeutic procedure

Based on the description presented in specialized procedures we have identified the costs of this first example.

We included in the category of direct costs: disposable protective equipment expenses (gloves, mask and crone) consultation kit expenses, other direct consumables, salaries direct procedure charges.

In the category of general operational costs (GOC) we identified three main categories of expenditures: the instruments, equipment depreciation and other operating expenses.

In the dental office in month "n", the total administrative expenses were N lei.

The question refers to the share accruing to this procedure of the total costs collected.

If we start from the classical model, namely "the structure process of relative figures" and take as allocated base the direct salaries (with the justification that they include in one hand the complexity of procedure and on the other hand the time spent) then the share of the GOC is determined as follows:

k1 = (procedure related labour expenses / total direct costs or expenses for the labour in the "n" month) x 100%

GOC share for k1 = k1 x N

To settle the general administrative costs (GAC) of the procedure taken as an example we consider as repartition base the total direct costs S0.

k2 = (direct expenses of S0 procedure / total direct costs of the office) x 100% and the share accruing to this procedure is

GAC share for k2 = k2 x total GAC

Following this example is found the high "relativity" of the procedure cost because if we refer only to the GOC we have identified eight possible positions over the dozens possible.

Example 2: Emergency treatment of acute pulp inflammation – according the procedure we distinguish two therapeutic procedures: primary consultation and tooth pain releasing treatment

Primary consultation:

Goals - diagnosis and recording in the emergency register

Spent time - 5-10 minutes

Difficulty - very low

Tooth pain releasing treatment:

Aims: inflammatory process delaying, pain management, preparation for final treatment intervention (nerve removal) in a following meeting.

Spent time - 10-15 minutes, depending on the positioning on the arch and the damage degree of the tooth

Degree of difficulty - low

For the first procedure identification and costs allocation are similar to the first example.

The appearance of additional procedure involves a settlement for the GOC and GAC. In this case direct related costs for the second procedure are: disposable safe equipment expenses, dental instruments costs (extraction elevators, mills, Black spoons, spatulas, etc.), other direct materials expenses (compresses, disposable cups, etc.), direct labour (direct salaries, taxes and fiscal obligations and social costs).

General operational costs are also more diversified as a result by increasing complexity of procedure. In this way, we identified several categories: instruments expenditures (high speed rotating instruments, vacuum, etc.), equipment depreciation and other operating expenses, etc.

To settle the GOC we proceed as follows:

m2 = (procedure related labour expenses / total direct costs of labour of the month "n") x 100%

GOC share for m2 = m2 x N

To settle the GAC of the procedure taken as an example we consider as repartition base the total direct costs S0.

m3 = (s1+ s2 procedure direct costs / total direct costs of the office) x 100%

and the share accruing to this procedure is

GAC share for m3 = m3 x total CGA

After determining the labour and procedures costs we have developed software for dental office which consists of a database with the study results and an access interface for dental professionals (Fig. 3(a), Fig. 3(b), Fig. 3(c)).

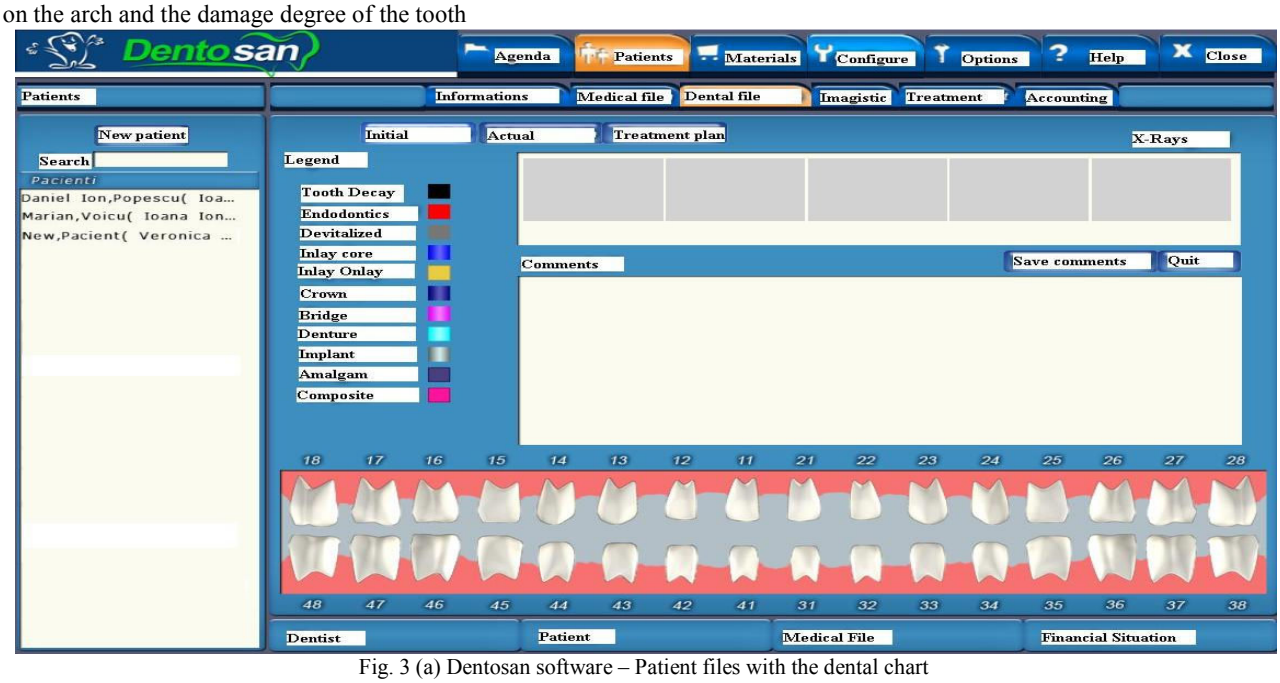

Fig. 3 (a) Dentosan software – Patient files with the dental chart

Fig. 3 (b) Dentosan software – Material stock

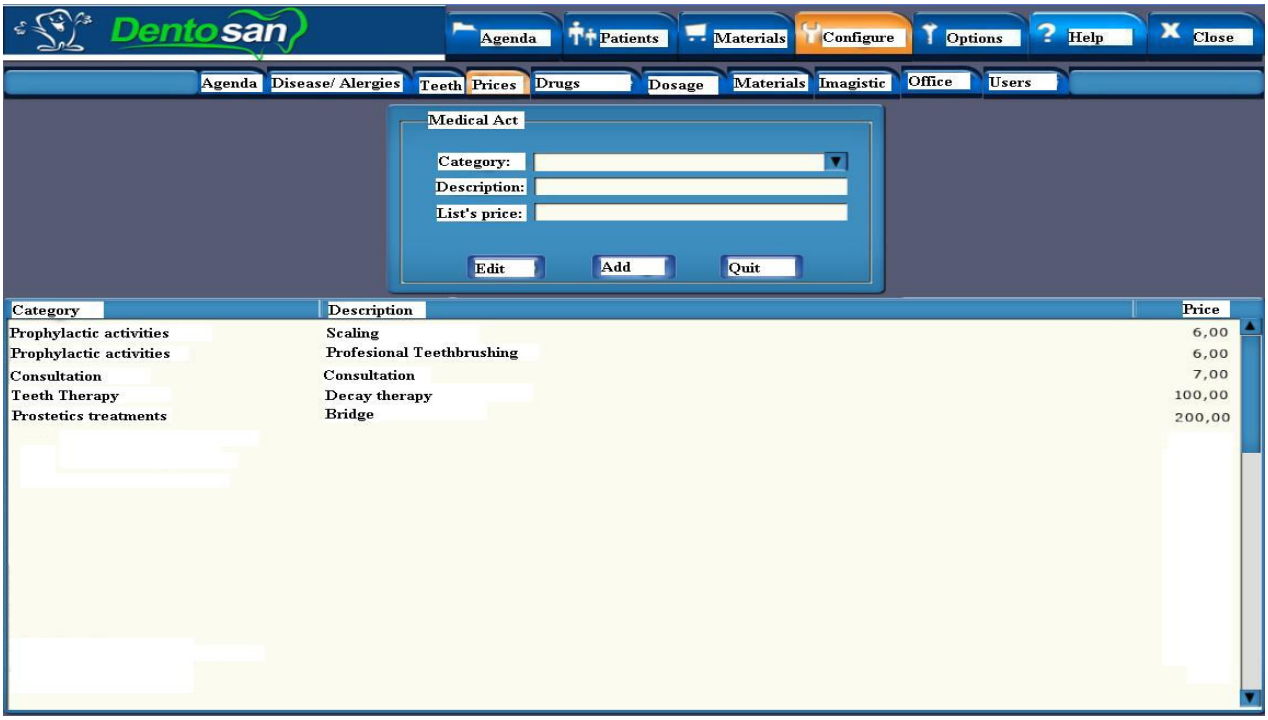

Fig. 3 (c) Dentosan software – Prices list

V. Discussions

Creating a software for increasing Romanian dental office activities efficiency was absolutely necessary in order to achieve management modernization in this stage of the global crisis. Although there are many softwares for many years in developed countries, the attempts to create and introduce friendly softwares in Romania were quite shy. The thinking of many doctors that patients are forced to come to the dentist and careless treatment quality, he will have to be paid, determines that many offices have no patients. Patients are

impressed, besides the modern design of the equipments and furniture, of the use of information systems.

The proposed software provides doctors from different dental specialties (implantology, peridontology, endodontics, prosthodontics, dental surgery, orthodontics) a specific approach to facilitate their work.

The real-time price set is warning doctors that they cannot go below the minimum rates, because of bankruptcy.

Although in Romania, in this ongoing transition period, the rules on statistical records are not respected by most dentists and in case of complaints or inspections from the authorities, doctors are very vulnerable. Obviously it is easier to keep records on computers than on paper. The program helps to quickly check the inventory of materials, to send for on-time delivery, considering that, in this time of crisis, some providers don't have large amounts of material on stock.

Another advantage of using software is dental assistant releasing of some administrative activities, considering that in Romania the number of medical staff from dental offices is very poor and it's expected to decrease in the crisis frame.

The implementing of this system in dental practice is unrolling quite slowly, so there are no evaluations since the use of it.

VI. Conclusion

The current economic situation of Romanian dental offices and the global economic crisis followings, request the use of a better management, but Romanian dentists are not prepared for it.

A much correct rates calculation helps the doctor in settle prices which can assure them a more efficient activity.

The study results helps doctors from different specialities, which in Romania are already six and they will increase, to guide their activity better.

It is too early to quantify the practice achievements of our proposals use.

Acknowledgment

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