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Evaluación del impacto de la formación en el sector sanitario

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Resumen
El impacto de la formación se refiere a los efectos que genera la formación en la organización. En este artículo se presenta una investigación sobre el impacto de varios programas de formación enmarcados en un Plan de Formación sobre el Uso Racional del Medicamento en Cataluña, en el que participaron casi 3.000 profesionales de la sanidad. El objetivo es evaluar si la formación de médicos y personal de enfermería disminuye el gasto público en medicamentos. Los resultados muestran que la formación no tiene el impacto esperado en la prescripción de medicamentos, debido a que hay otros factores en las organizaciones de la salud que limitan seriamente el impacto de la formación. Estos resultados nos llevan a realizar propuestas para la mejora de la eficacia de los programas de formación evaluados, y en paralelo, a reflexionar sobre las implicaciones metodológicas y técnicas de la evaluación del impacto de la formación.

Abstract
The impact of training refers to the effects generated by training in the organization. In this paper we present a research on the impact of several training programs framed in a Training Plan on Rational Use of Medicines in the region of Catalonia (in the northeast of Spain), where almost 3000 health professionals participated. The aim is to evaluate if the training of doctors and nurses decreases the public expenditure on drugs. The results show that training has not the impact expected on the prescription of medicines, because there are other factors of health organizations that seriously limit the impact of training. These results lead us to carry out proposals for the improvement of the effectiveness of the training programs evaluated, and in parallel to reflect upon the methodological implications and techniques of the evaluation of the impact of training.

Palabras clave
Formación continua; Resultados de formación; Impacto de la formación; Evaluación; Fármacos; Sector sanitario

Keywords
Training outcomes; Impact of training; Evaluation; Drugs; Health sector

1. Introduction

In an economic situation such as the present one, where the financial results determine every business decision, it is clear that the evaluation should be situated at the top of the investment in learning in order to provide information about the results expected, and about the effects generated, because the final objective of training is to improve workers' professional performance. In the current situation of organizations, the evaluation of training based only on satisfaction questionnaires, is not enough to obtain information on training effectiveness (Wang and Wilcoxs, 2006:533).

It is in this setting that the evaluation of training impact acquires a great prominence and becomes almost indispensable when giving sense to the investments made in the training of the employees (Dahiya and Jha, 2011). The evaluation of the impact refers to the benefits that training generates for the trainees as well as for their companies or organizations. This type of evaluation has also been characterized as "*evaluation of the effects of training*" (Waagen, 1998), since it has to do with the analysis of the global results of training.

The improvement in organizational results in terms of productivity, efficiency, effectiveness and customer satisfaction represents the final goal and the most desired result of training in an organization (Leung, 2006:79). The evaluation of the impact of training is one of the strategic phases to assure the quality of a training program, nevertheless, not all the organizations are carrying it out (Saks and Burke, 2012). According to one of the last studies on evaluation of training carried out in Catalonia (northeast of Spain), only the 15% of the polled companies confirmed to have carried out, on some occasions, some measurement of training impact (Eguiguren, Llinàs and Pons, 2006:156).

Several researchers have observed that the complexity and difficulty to evaluate training impact lies within the fact that the evaluation itself consists of the analysis of the impact of a system of training inside a general organizational system. This means that one must keep in mind other multiple systems that coexist with the training and can affect the results (Brinkerhoff, 2005; Nickols, 2005; Wang and Wang, 2005; Pineda 2007; Topno, 2012). Likewise, it is considered that to obtain an objective evaluation, the efforts for measuring the improvement in the organizational results can require a longitudinal study and, also, the participation of trainers, their supervisors or colleagues, and the managers of the organization (Swanson 2005; Leung, 2006; Weisweiler et al. 2013).

Nevertheless, if it is possible to identify valid indicators of the results of a training program -in terms of effects in the organization-, and it is manageable to isolate the remainder of the effects. Measuring those indicators yields information with a lot of potential for the organization. This information justifies the investment in training.

The analysis of the impact data is based on the observation of the evolution of each one of the selected indicators and of the direction followed by their evolution, to determine if the effect expected has been achieved or not. The experts in this field conceptualize the impact through two types of effects or indicators: *qualitative effects*, such as satisfaction with the job, climate, motivation, etc.; and *quantitative effects,* that also are called "*profit value of the training*" (Kirkpatrick, 1999; Phillips, 1997; Pineda, 2002; Wade, 1994; Taylor and others 2009), like, for example, increase of production. Quantitative effects can be expressed in financial terms.

How are these types of effects evaluated? On the one hand, the qualitative impact is evaluated through instruments designed *ad-hoc*, according to the elements that were intended to be evaluated. The questionnaires or surveys are the most common tools. On the other hand, the quantitative impact is measured by means of the analysis of the relation "*cost-benefit*" as a result of the training or by calculating its corresponding "*return on investment*" (ROI).

The majority of the evaluations carried out are based on quantitative impact indicators due to the difficulty and high cost of designing and applying instruments that measure qualitative impact indicators. In this context, the investigations of Aragón-Sánchez, Barba-Aragón and

Sanz-Valle (2003), Eguiguren, Llinàs and Pons (2006), among others, are significant. Likewise, the Australian Blandy, Dockery, Hawke and Webster (2000) developed a remarkable synthesis and perspective on the existing investigation in the area of the impact of training, in which they showed an analysis of the volume and the characteristics of training, and their relation with the costs, the financial benefits, and the productivity.

In an effort to present an alternative system to evaluate the impact of training, that allows at the same time to clearly isolate the effects of other organizational strategies on training, Russ-Eft and Preskill (2005) showed the application of an approximation of the qualitative type.

From a similar, but more extensive perspective, Brinkerhoff (2005) understands the measurement of training impact, not only as the object of evaluation, but as a part of the global evaluation of the organization.

Despite the difficulties found in the evaluation on training impact, it can be observed that its potential is very extensive and its benefits can be important both in a micro and a macro level. For example, Mitchell (2001) showed the opportunities of the evaluation of impact as a tool for the organizational development. Even designing indicators of qualitative and quantitative impact, he could not carry out their measurement and isolate the effect of other variables, but he managed to identify what elements of the organization highlighted the results of training, therefore making them measurable and thus contributing to the improvement of organizational processes.

It is from this perspective that we present the results of the evaluation of impact of a training programs sample, framed in a *Training Plan on Rational Use of Medicines in Catalonia* (region in the northeast of Spain). In fact, the evaluation of training impact belongs to a broader evaluation, which covers five of the six levels of the Holistic Model of Training Evaluation (Pineda, 2002).

In Spain, the pharmaceutical companies must hand in a part of their benefits to the Government. Afterwards, the Government invests that money in research and development initiatives. Some of that money was invested in delivering training on the rational use of drugs to healthcare professionals. This is the basis of the training plan mentioned in this paper, which is founded with public money provided by the benefits of pharmaceutical companies.

The training plan intended to focus on the fundamental problems detected in the use of medicines in the welfare environments. The training is centralized by a general company that offers training to the sanitary sector, but with a very active participation of the associated centers to this company, that are distributed among the Catalonian territory.

The objective pursued with the evaluation of the impact of these training programs is to visualize the effects of training in organization, and at the same time to assure the transparency of training and the profit value of the resources invested. The possibility to underline the effects generated by training in the organization will allow obtaining information to improve future training programs and will make possible to account for the training efficacy and efficiency of the agents involved.

In this study we pursued the following goals:

1. To analyze if the training of health professionals decreases the expenditure on medicines.
2. To evaluate the impact of the training plan on the rational use of medicines, in which almost 3000 health professionals participated.
3. To reflect upon the methodological implications and techniques of the evaluation of training impact.
4. To contribute to the scientific community the know-how obtained to mutually advance in this field of knowledge.

We expect that the results of this study contribute to expanding the investigation in this field and that they are an opportunity to establish a dialogue with the diverse agents involved in order to motivate their participation and responsibility toward the process of training.

2. Methodology

2.1. Sample of training programs evaluated

A sample of five training programs is chosen by means of a probabilistic and intentional sampling method. The evaluation of these programs contributes with valuable information for the organization and grants access to the data that it is going to be measured. The training programs are:

1. "*Updating the use of mood-altering drugs*". This is a traditional 30 hours training program, addressed to 27 medical psychiatrists.
2. "*Updating on new drugs*". This is a 15 hours traditional training addressed to doctors. It was attended by 21 trainees.
3. "*Use of medicines in the emergency room of primary health care*". This is a 12 hours traditional training program, for doctors in the emergency room and pediatrics in hospitals. It was addressed to 26 trainees.
4. "*Establishing and monitoring the Manual of Pain Treatment*". This is a 10 hours training program addressed to professionals of the hospitals area and of the primary health care area.
5. "*Infectious illnesses and use of antimicrobial*". This is a 20 hours traditional training program, in which the trainees are interns.

2.2. Indicators of training impact

The indicators of training impact were identified by two types of strategies. First of all, we organized a focus group with the trainers and the training managers of the five training programs. The purpose of this focus group was to identify the results of the training that would allow us to measure the impact in a suitable way, and also to define the possible indicators of impact, depending on how accessible the data were. Secondly, there was a meeting with an expert in pharmacology to validate the selected indicators of impact and to make sure that their measurement was viable.

In spite of the efforts to plot how the identified indicators can be approached, finally, only 50% of them were measured. Moreover, it is only possible to measure the impact of three of the five training programs: the "*Updating on new drugs*", the "*Use of medicines in the emergency room of primary health care*", and the "*Establishing and monitoring the Manual of Pain Treatment*". The "*Infectious diseases and use of antimicrobial*" and "*Updating the use of mood-altering drugs*" training programs faced complex difficulties in isolating the effects of training from other variables, and in gathering data in an effective way. The measured indicators are:

- Indicators of impact of the training program "*Updating on new drugs*":
  - Percentage of prescriptions of new drugs.
  - Cost of prescription of therapeutic new drugs.
- Indicators of impact of the training program "*Use of medicines in the emergency room of primary health care*":
  - Increase of the proportion of use of generic drugs.
  - Decrease of the proportion of use of new drugs.
- Indicators of impact of the training program "*Establishing and monitoring the Manual of Pain Treatment*":
  - Prescription of major analgesics.

Following the recommendations of several authors (Kirkpatrick, 1999; Wang, 2002, among others), a pre-experimental design with a control group is used, based on a pre-test/post-test design, of type IV in terms of Wang (2002). This type of methodological approach has been widely used in the evaluation of the training impact in the health sector (Biencinto and Carballo, 2004:112).

To begin with, for both the experimental group (the group of trainees in the training) and the control group (the group of non-trainees in the training) a measurement is taken before the training (September), and four measurements are taken in the successive months after the training (December-March of the next year). In the "*Infectious diseases and use of antimicrobial*" training program, the post-training measures were compared with those of the previous year, since the prescription of drugs involved in the training (antibiotic) varies much according to the period of the year. Finally, the measurement of the control group was not obtained in the "*Use of medicines in the emergency room of primary health care*" training program, due to the impossibility to access the data.

2.3. Internal and external validity

In order to guarantee the internal validity of the research, the experimental mortality (i.e. none of the trainees had left the training) was controlled.Also, the history of all the participants was checked to assure that the trainees, as well as the non-trainees, were exposed to the same process; for example, no change of functions between the professionals did occur.

With respect to the external validity, the changes in the organization and/or in the policies of management that can affect the prescription were analyzed, that is, the systems of incentives, management by goals, the participation in other training programs, etc. A management policy wass detected that could have affected the impact of two of the training programs; we will detail on this subject in the results section of this paper.

The duration and schedule of the training was also taken into account, because if the training is done during the labor schedule, the opportunities of prescribing can decrease. However, it is considered that this factor does not affect any of the analyzed training programs.

3. Results

We present here the results of the three training programs whose training impact we have measured. In this sense, a brief description of the training program is first provided as well as a discussion of the results obtained, detailing the particular aspects in each case.

3.1. Impact results of the training program: *"Updating on new drugs"*

"*Updating on new drugs*" is a 15 hours training program addressed to doctors. Its objective is to give theoretical basis to the doctors so that they can carry out a prescription based on scientifically tested results, to harness the selection of the safest drugs and the small costs drugs, and to diminish the prescription of new drugs when those do not add any value. This training program was attended by 21 trainees, and the methodology was a series of lectures.

The impact objective of this training program was to reduce the prescription of new drugs, as percentage of total prescription of each professional, and as cost of prescription. It is considered that new drugs have an elevated cost, and sometimes are not necessary, since other drugs with similar indications exist and they are cheaper and more effective. Thus, the indicators of impact identified for the evaluation are:

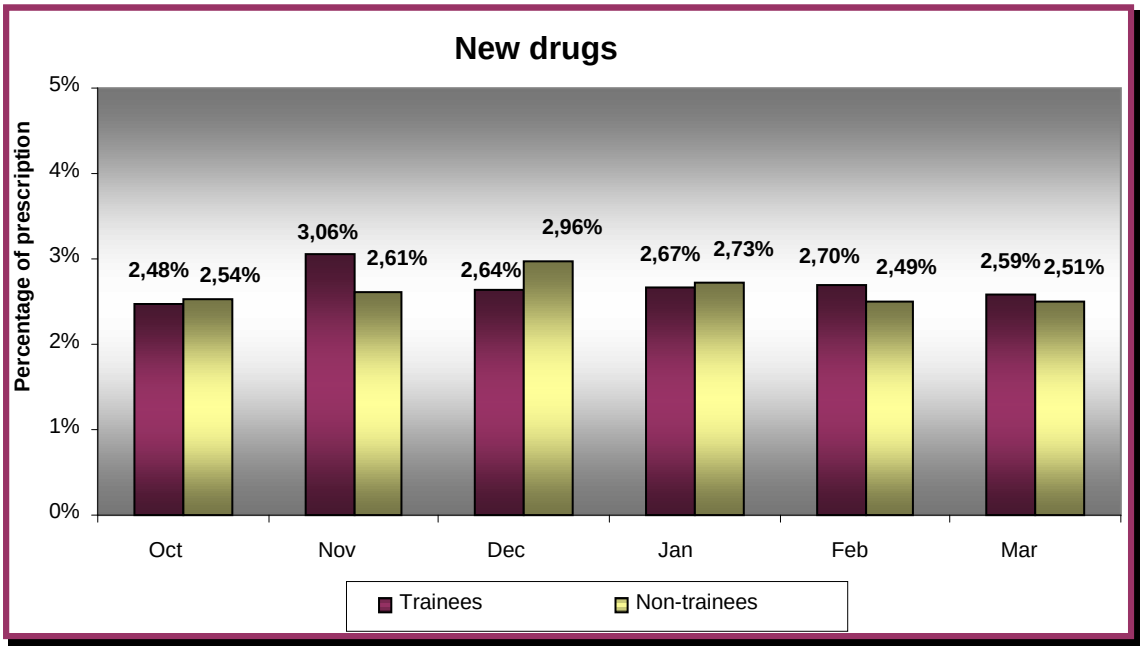
- Percentage of prescriptions of new drugs
- Cost of the prescription of new drugs

Both indicators were measured monthly for a period of 6 months after the training, and the information was taken from the database of the organization.

The impact results were measured with 21 health professionals, which integrated 80.6% of the people who had attended the training program. These people belonged to different groups; we display here the data solely on the group of doctors of primary health care, since this case is counted with a control group that allows validating the results. (see table 1 and graphic 1).

Table 1.
Indicators of impact of the training program "*Updating in new drugs*": percentage of prescription

Indicator 1		Oct	Nov	Dec	Jan	Feb	Mar
Percentage of prescriptions of new drugs	Trainees	2,48%	3,06%	2,64%	2,67%	2,70%	2,59%
	Non-trainees	2,54%	2,61%	2,96%	2,73%	2,49%	2,51%



Graphic 1. Percentage of prescription of new drugs

As we can observe in the tables, the indicator 1 ("*percentage of prescriptions in new drugs*") shows a certain increase among the doctors, increasing from 2.48% to 2.59%. If we compare this data with the group that has not received training, we can observe that the behavior of the indicator is very similar: the light increase in prescriptions of new drugs takes place among the professionals that have attended the training and also for those that have not attended the training.

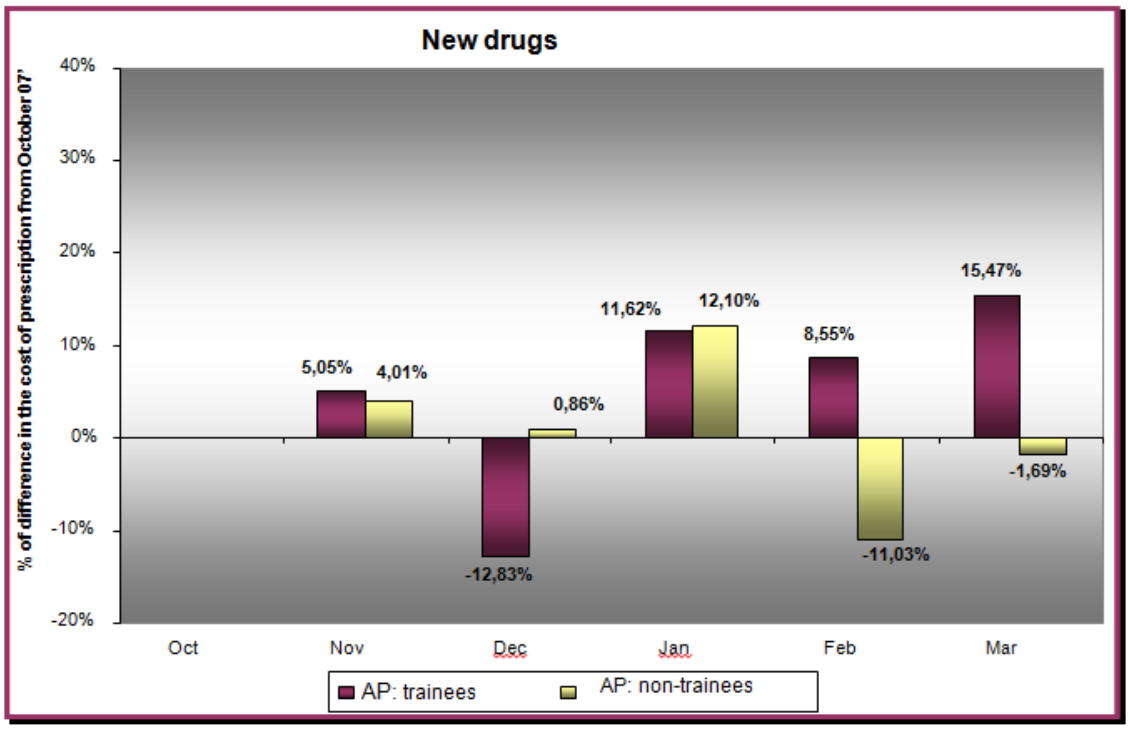
We can thus consider that the training has not generated the desired impact , since the percentage in prescription of new drugs is the same among the professionals that were trained and among the professionals that were not.

Indicator 2 analyzes the cost of prescription in new drugs. As we can observe, there is also an increase in the cost of the prescription for the group that attended the training, whereas the cost in new drugs for the control group falls slightly. (See table 2).

Table 2.
Indicators of impact of the training program "*Updating in new drugs* ": cost of prescription

Indicator 2		Oct	Nov	Dec	Jan	Feb	Mar
Cost of prescriptions of new drugs	Primary Health Care Trainees	6.114,48 €	6.423,42 €	5.329,76 €	6.825,05 €	6.637,27 €	7.060,33 €
	Primary Health Care Non-trainees	12.136,56 €	12.623,60 €	12.240,76 €	13.604,85 €	10.798,15 €	11.930,89 €

In order to deepen more in this indicator of impact, we analyze the percentage of difference in the cost of prescription of the months contemplated, in relation to the cost before the training - October - (see graphic 2).



Graphic 2. Difference in the percentage of cost of the prescription of new drugs

It is observed a clear reduction in the percentage of cost in the month of December among the professionals who attended the training with perspective to those who did not, but as it was seen in the previous graph, it increases back in January, arriving at similar values in both groups. However, in February and March, a peculiar behavior in the indicator was detected: while the professionals that did not receive the training diminished the prescription cost, those that received the training increased it. Therefore, we can see clearly that the training does not generate the desired effect.

The qualitative data collected through interviews leads us to a better understanding of the results. According to that, we observe that the lack of training impact can be due to several causes like the fact that the pharmaceutical companies exert pressure to increase the

prescription of their medicines, and have very interesting systems of incentives for their professionals. On the other hand, the working group also exerts pressure to increase the prescription and thus to get the incentives offered by the pharmaceutical companies.

3.2. Impact results of the training program: *"Use of medicines in the emergency room of primary health care"*

This is a 12 hours training program for the doctors of the hospital of urgencies, pediatric and primary health care. The objectives are to establish protocols for the most frequently used pharmaceutical treatments to benefit emergency situations and to improve the medicine use in these services. The methodology combines the theoretical classes with the case studies. In parallel some indicators are established to make a follow-up of the use of drugs studied during the training program. The training program counted with a total of 26 trainees.

The impact objective of this training program is to increase the use of generic drugs and to reduce the prescription of new drugs in the emergencies of primary health care, considering the percentage of prescription of each professional. The evaluated indicators of impact are:

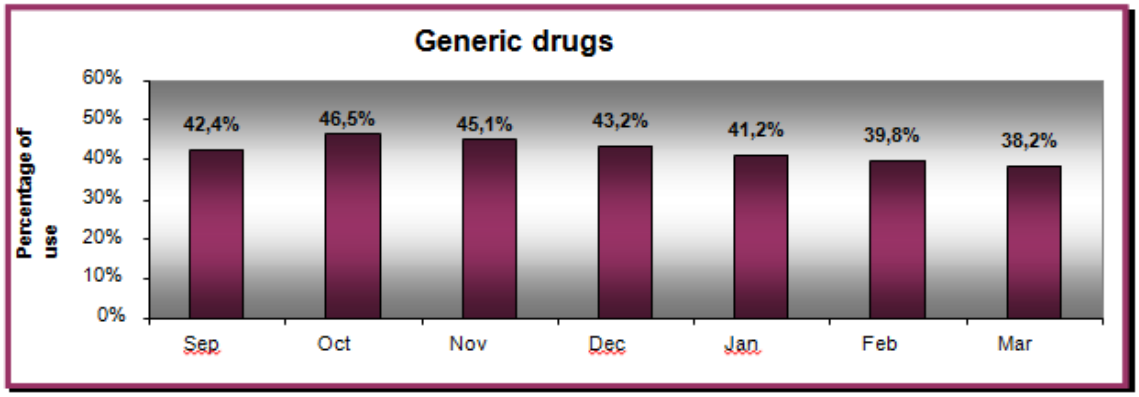
- Percentage of use of generic drugs.
- Percentage of use of new drugs.

The information is obtained from the database of the organization and the measurement was done monthly for a period of 6 months. It wasnot possible to have access to information of the indicators from the doctors who did not attend training, which is why, in this case, we do not have a control group.

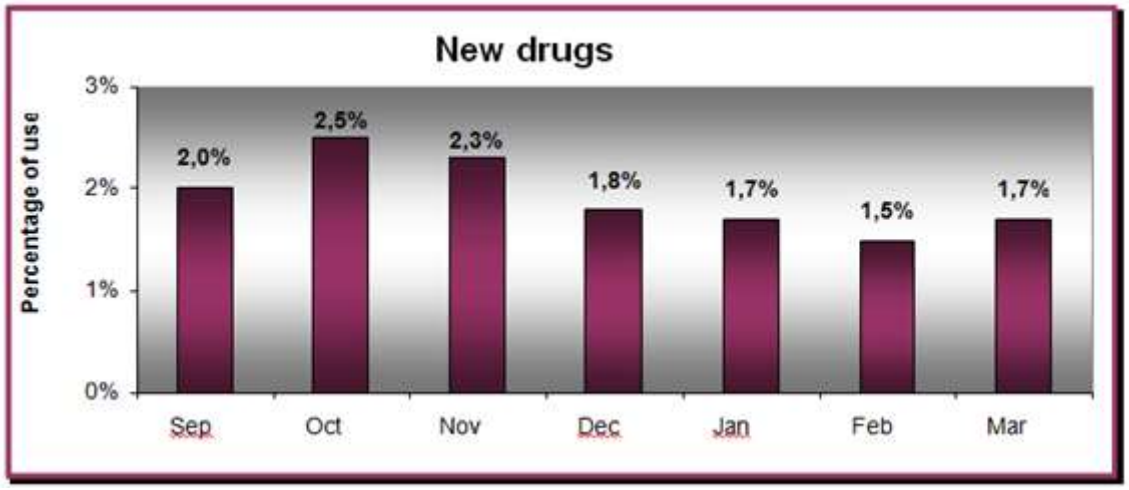
The following tables and graphs illustrate the results obtained in the measurement.

Table 3.
Indicators of impact of the training program "*Utilization of medicines in the emergency room of primary health care*": use of generic and new drugs

Indicators	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1-Increase of the proportion of use of generic drugs	42,4%	46,5%	45,1%	43,2%	41,2%	39,8%	38,2%
2-Diminution in the proportion of use of new drugs	2,0%	2,5%	2,3%	1,8%	1,7%	1,5%	1,7%



Graphic 3. Percentage of use of generic drugs



Graphic 4. Percentage of use of new drugs

Comparing the use of drugs before and after the training program, we observed that the percentage that use the new drugs falls, whilst the use of generic drugs increases slightly during the three months after the training, but later diminishes to levels inferior to those before training. These data state that the impact of training is partial: it occurs in the use of new drugs, but it does not occur in the use of generic drugs, and it does not maintain in time.

In this case, as the qualitative data suggest, other influential factors can be obscuring the impact of training, like the power of the pharmaceutical companies, that stimulate doctors to prescribe their drugs, therefore limiting the prescription of generic medicine.

3.3. Impact results of the training program: *"Establishing and monitoring the Manual of Pain Treatment"*

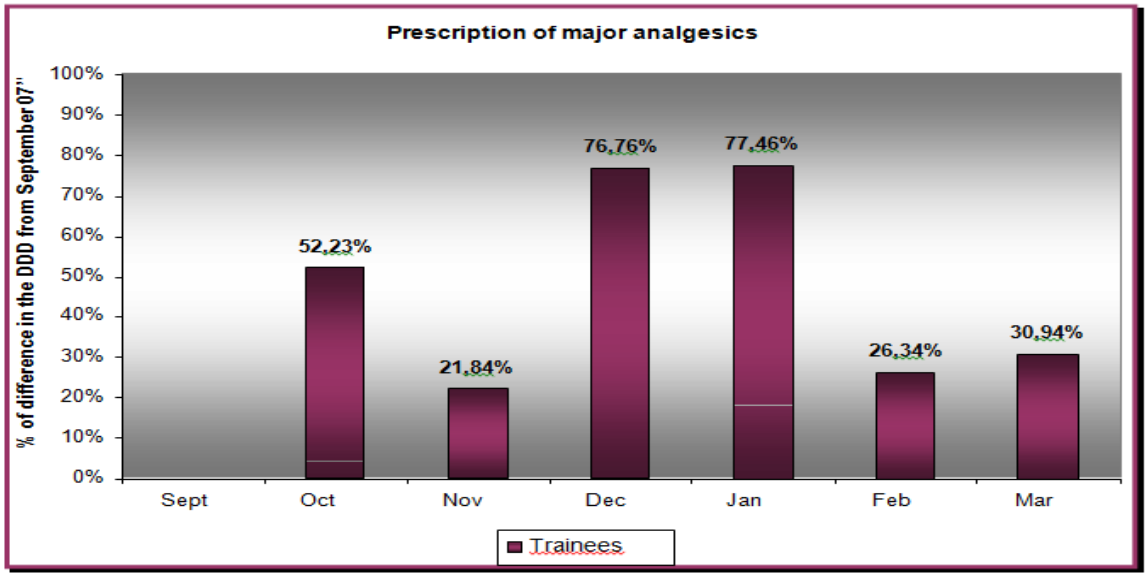
This is a 10 hours training program addressed to the professionals of primary health care of the territory of the Maresme in Catalonia. The training took place at the end of September, and there were 23 professionals participating in it. Its main objectives are to harness the use of the scales and the registries that include the "*Pain Treatment Manual*", and to stimulate the use of major analgesics for severe pain. The impact objective of this training program is to encourage the use of analgesic opioids, since it is a good indicator of praxis and a clear result of the application of the Pain Treatment Manual. The methodology consists of a lecture from the trainer about theoretical contents and a more practical part aimed at studying real clinical cases.

The impact of this training program is measured by means of one key indicator: the increase in the prescription of major analgesics. The unit of measurement used is the DDD (defined daily dose), and the information is collected monthly from the database of the organization. The indicator has been measured among 35% of the trainees of the training program, because of diverse technical problems in the access to data of the total of trainees, it has not been possible to collect the data about non-trainees, with the purpose of contrasting them with the previous ones.

The following results of impact have been obtained (see table 4 and graphic 5).

Table 4.
Indicators of impact of the training program "*Establishment and monitoring of the Guide of the Pain*": volume of prescription

Indicators			Sep	Oct	Nov	Dec	Jan	Feb	Mar
Volume of prescription of major analgesics	Trainees	DDD	1921,03	2924,38	2340,55	3395,63	3409,05	2426,96	2515,36



Graphic 5. Difference in the percentage of prescription of major analgesics from September

As we can observe, the training has had a positive impact, since the prescription of major analgesics, calculated in volume of DDD, has increased progressively in the months following the training, going from 1921 DDD in September to 2515 DDD in March. If we analyze the difference in the percentage of the prescription of analgesic with respect to the training received before September, we clearly observe the great increase detected in the months of December and January, and the more moderate, but important, increase in the months of November, February and March, that accounts for an average in the increase in the prescription of analgesic of almost 50% in the 6 months period that was analyzed.

The training generates the impact expected, since the percentage of prescription of major analgesics has increased. This shows an improvement in the praxis, as a consequence of the training program. But, it should be noticed that, since in the measurement of the impact, we only had access to the data of prescriptions of 35% of the professionals participating in the training, we have had to generalize and consider that the positive impact also occurs in the rest of trainees.

4. Discussion

This study has allowed us to develop a methodology to evaluate the impact and to apply it in a real context, thus detecting its opportunity and its limitations. We have also seen which key variables we have to consider in order to measure the impact of training in a rigorous and valid way in other contexts. In this paper, we display the lessons learnt and our reflections on the topic, as a contribution to the scientific community and to the researchers who work in the evaluation of the training.

The system created to evaluate the impact of training comes from the selection of indicators. The results demonstrate that this is a key step, since the indicator that is selected will assure the viability and the validity of the evaluation. In this case, we conclude that a central element in the selection of indicators is the joint work between the evaluators and the experts in the thematic of training, as well as the consensus with the organization. In the study we chose the indicators in a session work with the trainers and the training managers involved in the training programs evaluated. Afterwards, each indicator was selected and outlined with the advice of an expert in the sector. We consider that this procedure has been very successful, since the indicators of impact obtained are solid, valid, and viable in their evaluation and agreed with the professionals involved in the process. We outline that having valid indicators facilitates the process of collecting and interpreting information, and it allows us to obtain results directly associated with the effects of training.

Another important element in the evaluation of the impact is the facility to access the data in the organization. In the present case, the information on medical prescription is computerized, and the organizations involved have facilitated us the possibility of working with the data available. This is a central element, since if the data on the impact indicators is not available and the evaluator must locate it on their own, the effort increases exponentially, which can contribute to the project being abandoned or the impact finally not being evaluated.

The impact measurement should be done during a prolonged period of time, to see the evolution of the indicators and the maintenance of the results in that time. This also allows us to detect a phenomenon that occurs with certain frequency: the 'post-training euphoria', the transfer of learning just when the training finishes, as a way of testing it or because of the enthusiasm of the new, but its disappearance after a relatively short period of time due to diverse factors, like forgetfulness, external pressure, etc. In one of the evaluated cases this phenomenon occurred: the prescription of generic drugs increases during the three months following the training, but it declines in the following months. The measurement of the indicator during an extensive period of time has allowed us to identify this phenomenon, and to affirm that in this case the training does not generate the impact expected.

Having a control group is another relevant aspect which increases the validity of the results, and allows isolating the effect of other numerous variables of training. In two of the three evaluated cases, there was a control group, which means that we also collected data on the indicators of impact from people who did not receive training. We have detected that, in one of the cases, although changes in the indicator occurred, the training did not have the expected impact, as the changes also occurred in the group that did not receive the training. The control group consequently allows to validate the results obtained and to isolate with rigor the results of the training.

Although there is a control group, it is necessary to detect, and if possible to isolate, other external variables of training that can condition the impact; we are talking about the external validity. The variables of the organization that can affect the training are numerous and vary in each case, but the most relevant are the internal and external policies of management in the organization, changes, the HR policy, incentives, goals management, the participation in other training programs done, etc.

The results obtained in the evaluation of impact through our study indicate that the training in the rational use of the medicine does not generate a reduction in the pharmaceutical prescription, especially with regards to the prescription of new drugs. The analysis of the external validity and the qualitative data from the interviews allow detecting other systems more effective than training, for instance the incentives systems, which could eclipse the effect of the training. The economic incentives that the pharmaceutical companies give to doctors have a much stronger effect than any training and learning. The quantitative and qualitative results collected in this study demonstrate that an economic or material incentive, an extra bonus or complimentary increase of the salary is more powerful than attending a complete training program very well-designed and oriented to decrease the medicines expense.

These results suggest the convenience of introducing other more effective strategies than training to modify the prescription by the professionals, like for example the goals management , the creation of alternative systems of incentives -not exclusively economic-, the control of the incentives from the pharmaceutical companies, etc. The resources saved from training on medicine use could be destined to cover other training needs in which more effectiveness is guaranteed.

By analyzing external variables, we can explain the impact of training and, as other studies show (Brinkerhoff 2005, Nickols 2005; Wang and Wang 2005), it allows us to understand how training interacts with other systems in the organization and to make decisions to improve its effectiveness. The impact evaluation becomes something more than a measurement of the effects of training; as Mitchell (2001) shows, it is transformed into a tool for organizational development. It becomes a mechanism to identify those aspects of the organization that determine which trainings generate real results and to define coherent and effective HR developing policies.

The evaluation of training impact, besides being viable, can be a very useful strategy for the HR professionals, because it can optimize the development of the people who integrate the organization and the organization itself.

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