



Clute Institute
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European
Applied
Business
Research
Conference

The Use of Market Intelligence Tools to Improve the Results of Diabetes Treatment in the Mexican Public Health Sector

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Abstract

The pharmaceutical products market has four main actors involved: health providers, health payers, patients and pharmaceutical companies. The relationship between health providers and the pharmaceutical companies that supply the products required to prevent and treat illnesses is of particular interest. This relationship can be described within the frame of the treatment of diabetes mellitus (DM), a major health issue in most countries, and an urgent one in Mexico. The results obtained by the public health system in the treatment of diabetes could improve through the use of the tools provided by market intelligence systems and best clinical practices. These results could be measured through major health metrics for the relevant population, including morbidity, mortality and life expectancy.

Keywords

Pharmaceuticals, diabetes mellitus, healthcare, health metrics, market intelligence.

Introduction

Health care is an international priority to which a large number of human and material resources are dedicated. Given the magnitude of such resources, it is relevant that their administration be as efficient as possible, while seeking to cover the needs of the attended population in the best possible manner.

One area of opportunity in the administration of resources for the public health sector in Mexico lies in the use of market intelligence methods by all involved parties, in order to solve issues such as:

- Demand planning.
- Social marketing.
- Treatment guidelines.

It could be expected that improved market management through market intelligence tools would impact some relevant health metrics, particularly when applied to the requirements for pharmacological treatments. Relevant metrics for the health sector include the following:

- Morbidity
- Mortality
- Life expectancy

Materials and Methods

Information was gathered through research in major academic databases (Ebsco, ProQuest, PubMed, Emerald) of relevant studies related to the treatment of diabetes, focusing on the pharmacological treatment of the disease, and circumscribed whenever possible to the current situation at the Mexican Institute of Social Security (Instituto Mexicano del Seguro Social, IMSS). Other topics researched include: health services marketing, demand planning, market intelligence, cost of treatment and patient compliance.

The data presented was supplemented by conducting interviews with experts in the fields of medicine and pharmaceutical marketing, in order to get views leading up to a better understanding of the management of the pharmaceutical products market within this context.

Diabetes Mellitus

Diabetes mellitus (DM) can be defined as a metabolic disease produced by defects in the secretion of insulin, inadequacies in its action, or both. It constitutes a major health problem in Mexico, with high incidences and prevalences across the country. It is also one of the main causes of medical consultation and a treatment challenge for both patients and physicians (Oviedo Mota, *et al.*, 2003).

Manifestations of DM include polyuria (frequent need to urinate), polydipsia (increased thirst), weakness and weight loss, but some patients might arrive at the doctor's office with more serious complications derived from chronically high levels of glucose (Fauci (Ed.), *et al.*, 1998), such as the following:

- a) Retinopathy

A progressive degeneration of the retina, it is the most frequent cause of blindness in adults. Intensive treatment to achieve normal levels of glucose can prevent or delay its onset.

b) Neuropathy

It constitutes an irreversible complication of diabetes, which manifests itself through alterations of reflexes, sensibility, and the perception of pain, tactile sensations, temperature, vibration and position.

c) Nephropathy

Characterized by a gradual dysfunction of the kidneys, diabetic nephropathy is the main cause of chronic kidney disease. Again, strict glycemic control can delay its onset and progression.

d) Cardiovascular disease

This constitutes the main cause of death in diabetic patients. It can be prevented by closely monitoring the patient for hypertension and renal function, which are two significant risk factors.

e) Hypertension

It affects more than half of the people with diabetes, and is a major risk factor for cardiovascular disease and microvascular complications such as retinopathy and nephropathy.

f) Dyslipidemia

Defined by deficient levels of cholesterol and triglycerides, it also represents an important risk factor for the development of vascular disease.

Treatment of Diabetes

People diagnosed with diabetes mellitus should be treated by a multidisciplinary team that includes a nurse, a nutritionist, and psychological experts under the guidance of the treating physician. As with many other metabolic diseases, specialists recommend to start treatment of diabetes with dietary and exercise recommendations. It is important to mention that even though there are two distinct types of DM (Type I and Type II), many studies consider it as one disease (Pagano, *et al.*, 1999), and for analysis purposes it will be considered as such throughout this document.

Education of the patient is key for treatment success, as is the active participation of his/her family. The initial diet and exercise programs aim to maintain glucose levels within a strict range to prevent or reduce the risk of complications. Exercise programs should be carefully designed after the medical evaluation of the patient's general

health status. All plans should be targeted to the individual needs of the patient, and close monitoring is essential to ensure compliance and reduce the likelihood of progression, or at least delay it as much as possible.

If dietary and exercise recommendations fail to achieve an adequate control of glucose levels, then the patient can receive a set of medications known as “oral hypoglycemic agents” (Oviedo Mota, *et al.*, 2003), which include the following:

1. Sulfonylureas:

These drugs reinforce the secretion of insulin, and work particularly well in recently diagnosed, non-obese patients. An example is glibenclamide, which is also one of the most widely prescribed drugs for diabetic patients at the IMSS.

2. Biguanides:

Used for the treatment of obese patients, they lower levels of plasma glucose and also cholesterol and triglycerides. An example is metformin, which reduces the production of hepatic glucose and increases the muscle’s sensibility to insulin. It is sometimes used in combination with glibenclamide.

3. Alpha-glucosidase inhibitors:

Their main effect is to lower glucose levels after meals. They interfere with carbohydrate digestion and delay glucose absorption.

When the highest dose of oral medications fails to control glucose levels, direct administration of the hormone insulin is required. In Mexico, there are 3 kinds of insulin, according to speed of action, and in every case the dose should be adjusted to each individual patient. Self-monitoring glucose devices are particularly helpful to ensure good metabolic control.

The Economic Burden of Diabetes

Around the world, the cost of medical care has been rising and this creates resource allocation problems that call for economic evaluations to become an integral part of disease management. Diabetes mellitus is a very frequent and challenging pathology, and its complications can lead to disability, reduced life expectancy and huge healthcare costs (Pagano, *et al.*, 1999). These costs arise mainly from direct healthcare activities and loss of productivity, and force health services to improve their quality of care while paying attention to the financial impact of the disease.

The following expert opinions underline the need to apply economic and financial measurements to the evaluation of the different courses of treatment currently available for diabetes patients:

Johnson, et al. (2006) describe that information on the burden of health conditions, be it in epidemiological or economic terms, is of great interest for those responsible of establishing policies. This information is relevant because it enables administrators and physicians to make informed decisions regarding resource allocation for the management of existing and foreseen diseases, and also because it gives them tools to justify health promotion and prevention programs.

On the relevance of treating diabetes, from a cost-effective standpoint, Kapur (2007) believes that effective intervention should include primary and secondary prevention, and that everyone involved in diabetes care needs to know the costs related to the treatment of this illness. Furthermore, this author states that inadequate treatment of diabetes is very costly, which is a very interesting point of view, particularly in developing countries, where cost contention is of the utmost importance.

Ramachandran, *et al.* (2007) highlight the need to have consistent data on the cost burden of diabetes, given the fact that, particularly in developing countries, there are isolated and non-comparable data on this regard.

Adding to the cost issue, Zhang, *et al.* (2004) believe future studies should favor cost-saving interventions, like intensive control of blood pressure, in order to offer economically feasible solutions to diabetes treatment. Another effective intervention lies in the control of glucose levels, through appropriate courses of action for each particular patient.

In all cases, the bottom line is that for diabetes patients, a strict metabolic control achieved by early interventions is more cost-effective than the management of the resulting complications when initial treatment fails to reach its goals.

IMSS

The public health sector in Mexico is represented mainly by the Mexican Institute of Social Security (Instituto Mexicano del Seguro Social, IMSS), founded in 1943 by a group of employees, employers, and the Federal Government. It is the largest social security institution in Latin America and has a workforce of over 370,000 employees across the country. Nowadays, the IMSS faces difficult conditions that threaten its viability, and its administration is focused on making the institute more modern and efficient, in order to increase earnings and reduce non-priority expenses (IMSS, 2002).

The IMSS reports a constantly increasing number of patients treated due to diabetes and its complications. This increase might be caused by a higher incidence of the disease, and also by the longer life expectancies of patients (Escobedo de la Peña and Rico Verdín, 1996). Two additional factors that complicate diabetes management at this institute are the following:

- a) The lack of experience and knowledge of some of the first-contact physicians that diagnose and treat diabetes. These are usually general practitioners on small clinics and hospitals (catalogued as being the “first-level” of contact within the system) who, due to high workloads and sometimes lack of motivation, don’t have enough time to educate themselves and their patients (E. Rodríguez, Personal Communication on March 14, 2008). These limitations result in poor metabolic control of patients and therefore are associated

with higher incidences of complications that require hospital treatment at higher levels of attention (second- and third-level hospitals) (Rodríguez-Moctezuma, *et al.*, 2003).

- b) The low treatment compliance observed in almost half of diabetes patients (Durán-Varela, *et al.*, 2001). Again, mostly due to low baseline education levels of the patients and to the very little and inaccurate information they receive about their disease, these patients do not assign sufficient priority to their treatment and control. This factor also has a negative impact on the development of serious diabetes complications that could be otherwise prevented or delayed.

These factors contribute to the high reported number of DM complications (Sabag-Ruiz, *et al.*, 2006) and the frequent hospitalizations related to this disease within the institute (Membreño Mann and Zonana Nacach, 2005). Both occurrences reflect the need for improvement in the treatment of diabetes patients, and also constitute areas of opportunity to improve the institute's budget allocation.

The IMSS currently does not engage in market research to find out what its customers need (we understand customers here as the physicians who have the institute's patients under their care); and because of the lack of a market intelligence department, drug purchases are often not made according to the existing epidemiology. This might be an issue that leads to poor glycemic control in the diabetic patient, which, when chronic, leads to costly complications that increase the burden of the disease, both in social and economic terms.

1 Access to Drugs

The access to life-improving drugs and their quality is an international source of debate. The allocation of health budgets relies on a number of factors, among which is the perception of utility of the drugs themselves and the relationship of the health sector with the pharmaceutical industry that supplies these drugs. By reviewing reports of several institutions comprising the health sector in Mexico, it can be acknowledged that there is a sub-optimal use of expense budgets, and this generates a situation where not all the needs of the population can be adequately covered (L. Jasso, Personal Communication, September 21, 2007).

It is expected that the pressure on health expenditure will increase worldwide, and it will come from different sources according to the Organization for Economic Cooperation and Development (OECD, 2006):

- The population age, although it might not contribute as much as expected.
- The increase in earnings, because the population will demand better quality in healthcare.
- Prices assigned to health services, which are expected to rise at a higher rate than the general price level.
- The arrival of new treatment options, which should be carefully evaluated.

Health expenditure in Mexico is comprised by what society pays for through taxes and what comes directly out-of-pocket. The former is called public expenditure and is exercised by all public institutions that are part of the health system; the latter is the private expenditure, and includes the payments made by families for their own healthcare (Secretaría de Salud, 2006).

While there is no direct relationship between health expenditure and the results of the healthcare system, it could be assumed that these results would improve with increased and better managed resources, because more of the population's needs would be covered then. However, sometimes health interventions lack efficiency and thus this cannot be actually demonstrated (Secretaría de Salud, 2006).

Health Services Marketing

As a tool to help in the management of health expenditure, and therefore improve the general situation of the pharmaceutical products market, it would be useful to consider the alternatives offered by the discipline of health services marketing. Marketing (in general) consists of identifying and satisfying the needs of people and society, in a profitable manner (Kotler, 2006). A branch of this discipline is services marketing, which takes place when the some or all of the following conditions are met:

- Customers do not own services.
- The market consists of service products, which are temporary and cannot be inventoried.
- Value creation is dominated by intangible elements.
- Customers might be involved in the production process.
- Other people can be part of the final product.

Within the context of services marketing, Health Services Marketing can be classified as a “people process” activity, since a high level of participation is demanded from patients (when receiving treatment at a hospital, for example) and the result is a customer that reaches the desired objective of a better health status (ideally). This means that the customer (or patient) undergoes a process in order to obtain a desired service. Other examples of people processes are: transportation, restaurants, hotels, etc.

Besides people processes, services marketing encompasses possession processes (like repair shops and cleaning services), mental stimuli processes (promotion, education, art), and information processes (banks, insurance companies, legal services) (Lovelock, 2004).

The marketing mix for the marketing of services adds 3 new elements to the traditional marketing mix: besides Product, Price, Place and Promotion, it includes Processes, People, and Physical Environment. Two other essential factors to consider when analyzing the management status of a product or service are strategic planning and the supply/demand balance.

On this last issue, there is a need to apply effective strategies to minimize potential losses due to supply/demand imbalances, and a tool to face this challenge lies in the knowledge and use of market intelligence activities. These activities can collaborate in demand planning and forecasting and therefore reduce the frequency of unexpected imbalance situations, which are usually very costly. In the past decade, there has been great interest in conducting studies to try to explain how the application of market intelligence tools to understand demand trends can improve the financial results of organizations by reducing losses due to these imbalances (Shemwell, 1994).

Market Intelligence

According to Cornish (1997), Market Intelligence can be defined as the process of acquiring and analyzing information in order to understand the market, determine its needs and preferences present and future, as well as its attitudes and behaviors, and evaluate environmental changes that might affect the size and nature of said market in the future.

Market research is a critical part of market intelligence systems; it allows the improvement of the decision-making process by providing relevant, precise and timely information. The use of databases as analytical tools includes the use of statistical techniques, modeling and results that generate useful information that helps in market planning and budget setting (Kumar, 1999).

Market research activities include identifying, collecting, analyzing and spreading information in a systematic and objective manner with the purpose of assisting the decision-making process. This is particularly important for administrative decisions related to problem identification, and those needed to take advantage of market opportunities. There is a current trend towards an integral view of market intelligence, oriented to the solutions that market research can offer (Tan Tsu Wee, 2001). The goal of the organization must be clear: to maximize profitability (Lackmann, 2000) and, for health services, to improve productivity and outcomes.

In spite of all the evidence, health organizations do not yet allocate a relevant share of their budgets to market research. Some private hospitals in Mexico have started to show an interest in market orientation, by seeking tools used by consumer industries to try to understand the problems and opportunities that surround them. Still, in a study from the past decade where a group of hospital managers was interviewed (Loubeau, 1998), most of them reported no investment at all in market research to follow-up on the effectiveness of promotion activities carried out by their own institutions.

This same study found that even in hospitals that did engage in market research, they failed to make use of all of its benefits in their daily administration duties. It is now recommended to invest in the optimization of this tool to enhance the decision-making process.

Another issue worth mentioning refers to budget allocation. During the budget definition process in every industry, there's a need for a group of people capable of communicating with the rest of the organization in order to gather the necessary market intelligence. The abilities of this group should include: quantitative, informatics, and communication skills, as well as business knowledge and process management (Lapide, 2003). There are currently no reports of such a group within the budget allocation process at the IMSS.

In an industrial context, if a company doesn't have the information needed to accurately evaluate its own strategic situation, it is very unlikely that it will be able to make strategic decisions that will maximize its profitability (Makadok, 2001). These concepts can be applied to the administration of health institutions, and the impact of market intelligence on their productivity can be measured.

Health Metrics

A practical way of measuring the results and productivity of a healthcare institution is through health metrics. These are outcome measures that reflect the efficiency of the organization through well-being indicators in the relevant population.

In the near future, it is foreseen that healthcare and particularly the care of chronic diseases, will become very relevant worldwide. Health sector purchasers will be responsible to their authorities for cost control, and to the patients for the quality and accessibility of the health services they provide (OCDE, 2006).

In this regard, those decisions that favor lower cost alternatives will be rewarded. It is well known, for example, that ambulatory care is generally less expensive than hospital care. It can be expected, then, that interventions to limit the need for hospital stays will improve an institution's financial status. In the case of patients with diabetes, this could be achieved by establishing the infrastructure needed to ensure good glycemic control, an ambulatory intervention that can effectively reduce complications that require costly hospital stays. This infrastructure should include access to drugs as well as education programs for all involved.

To provide a relevant framework for market management analysis, an integral definition of health services must include the following:

- A clear description of the costs and benefits associated with ambulatory care.
- Market information for the cases when hospital care is demanded.
- An assessment of the human resources available.
- Enforceable guidelines on the use of pharmaceuticals used to prevent and treat illnesses.

Countrywide, Mexico spends 33% of its total health expenditure in hospital care, 31% in ambulatory care and 22% in pharmaceutical products (OECD, 2005). In comparison with OCDE country averages, the pharmaceutical investment is marginally higher and the hospitalization expenditure is marginally lower. These trends should be reflected equally in the public and private markets, but experience tells us that this is not the case, and the public sector spends more on hospital care and less in pharmaceutical products.

In the health system report created by OCDE, there's an important reference made to the quality of health services in Mexico, which is perceived as not always being up to international standards. This probably arises from the fact that public hospitals and clinics often don't have the qualified personnel and necessary resources to provide good health services. Additionally, the epidemiological transition from contagious diseases into chronic illnesses related to advanced age of the population presents a new set of challenges for the system, and appropriate monitoring and control metrics are not always in place.

The higher incidence of chronic diseases in Mexico seems to be associated with a current trend towards unhealthy nutritional habits and an increasingly sedentary lifestyle, that is reflected in the growing number of patients with diabetes that seek medical care each year. Diabetes has thus become the leading isolated cause of death in the country (OECD, 2005).

As an answer to the challenges faced by the health system, particularly in the public sector, there have been some government initiatives that seek to include result measurements in terms of service quality. A confounding factor is the high cost of administrative services related to the health sector, that represent 23% of the total budget of the Health Ministry and the State Services of Health, as well as 17% of total IMSS expenditure.

Great budget limitations are then placed upon the system, and their effect is deeply felt in the capacity to purchase health-related materials and medications, more than in administrative areas. The lack of proper drugs to treat diseases is one of the areas that generate the most dissatisfaction among service users. The supply issue is further increased by a centralized and inefficient distribution of drugs and medical materials.

Productivity measures tend to be complicated when applied to services because sometimes results are difficult to define, and healthcare services are no exception. It is important, then, to seek a metric as standardized as possible in order to make quality and efficiency comparisons for services such as healthcare.

One example of such measurements are end-result metrics for diabetes patients, even when there is no current consensus about which are the best result indicators for these cases (Smith, 1996). There are, however, some traditional outcome measures that are considered relevant in the determination of service quality in a hospital setting.

These measures include:

- Mortality.
- Length and number of hospital stays.
- Amount of complications that require treatment (morbidity).
- Required in-patient and out-patient procedures.

They are also considered more relevant and consistent (Finkelstein, 1997) than other, patient-centered measures like:

- Treatment satisfaction.
- Functional state.
- Time needed to resume work.

Some publications also point out that the success of a social marketing program is usually measured in terms of mortality reduction, which is considered then as an important metric in this setting (Anonymous, 2002).

Regarding life expectancy as a general indicator of health, some international studies suggest that better access to drugs can constitute an effective strategy to diminish global health costs. This stems from the fact that an increase in pharmaceutical spending is compensated by the decrease in other health costs, without affecting the health of the population, as a recent Canadian study demonstrates (Crémieux, 2007).

Government Initiatives

The main government plan of action in Mexico is named Plan Nacional de Desarrollo (National Development Plan), and its version for 2007-2012 includes some initiatives that are relevant to the optimization of resources used for the treatment of chronic illnesses such as diabetes. It recognizes that the longer life expectancy of the population brings about a change in the main causes of disability and death. Today, the main culprits are non-transmissible diseases and lesions. One of the main illnesses associated with longer living is diabetes, which, along with hypertension and accidents represents 85% of all deaths in the country (Gobierno de los Estados Unidos Mexicanos, 2007).

There is also mention in the Plan of the high cost and complexity of treating diabetes, and this realization brings it into the spotlight as a highly demanding need of the population. Obesity, poor nutritional habits and lack of exercise are related to heart disease and diabetes, which together account for 32% of deaths in women and 20% in men. The supply of drugs to prevent and control diseases has seen an improvement in ambulatory centers, but not yet in hospitals. These worries are reflected in the following sections of the Plan:

- Strategy 5.1 of the Health section of the Plan proposes to create an integral system to improve the quality of medical services, focusing particularly in the timely supply of drugs. It seeks to optimize drug expenditure in public health institutions, to ensure drug safety and efficacy, and to institutionalize the analysis, design and evaluation processes of the pharmaceutical policy.
- Objective 8 in the same document is to ensure that health contributes to overcome poverty and support human development in the country, particularly by making sure that work environments are healthy, and focusing on the prevention and control of invalidating diseases and the control of addictions. The promotion of healthy lifestyles will be paramount to be successful in these efforts, as well as the availability of early diagnostic tools and appropriate treatments for chronic disease.

These official statements lay the foundation for a deeper understanding of the social and implications of diabetes, its treatment and management in the Mexican population. The success of these initiatives will depend on their diligent implementation and control.

Discussion

Market intelligence can be used as a competitiveness tool in the marketing of health services. Its main impact lies in the demand planning process, which, when based on market intelligence systems, can improve budget allocation and resource management for the IMSS, as well as other public health institutions in Mexico.

A critical issue in the healthcare equation is the availability of pharmaceutical products. This, along with appropriate education programs for both patients and caregivers, will most likely facilitate appropriate courses of treatment, which in turn can be expected to have a positive effect on health outcome metrics such as mortality, morbidity and life expectancy.

This relationship is particularly visible in the case of diabetes mellitus, where good metabolic control in the form of normal glycemic levels effectively delays or even avoids the development of complications. Once it is established that the treatment of these complications is a lot more costly than their prevention, both in social and economic terms, the rationale for investing in metabolic control strategies becomes clear.

2 In order to implement changes in the way purchases are made in public institutions, we first need to understand the dynamics of the pharmaceutical products market in Mexico. A general feeling of distrust has divided both sides of this market, making it difficult to transfer to health institutions those strategies that have proved successful and worthwhile to the pharmaceutical industry. Careful policies need to be established in order to improve this relationship and open up the way for shared learning.

Through careful marketing services analysis in the health sector in Mexico, areas where substantial savings can be made will be identified, and the resources freed by the resulting strategies can be used to tend to other urgent health needs of the population.

Conclusion

In the current national and international environment, it is of paramount importance to evaluate the current processes of the IMSS regarding its relationship with the pharmaceutical industry, its demand planning structure and its purchasing needs. This will allow for particular recommendations to be made on the best implementation strategy to ensure that the institute takes advantage of current administrative tools to improve its productivity and results.

The analysis of health metrics and their relationship with treatment courses is a key step in this process, because it will help establish clear guidelines for treatment, and will also serve as a baseline of what educational programs must strive to achieve.

The analysis of healthcare services is an important competitiveness factor that can help improve the position of Mexico in an international setting. Not just for the health of patients, but for the country's economic development as well.

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