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THE IMPORTANCE OF THE DRUG STORE PHARMACEUTICAL PROFESSIONAL IN KNOWLEDGE OF CLINICAL ANALYSIS.

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SUMMARY

The Pharmacist who works in Community Pharmacy must be aware of the pharmacological data of the medicine, its possible interactions with biological parameters and other medicines, applying the knowledge of his multidisciplinary curriculum in order to provide perfect Pharmaceutical Assistance to his patients. Clinical analysis is a branch of pharmacy responsible for diagnosing different pathologies and is, without a doubt, a tool of great importance for medicine. This monograph portrays the importance of the biochemical professional, the role he plays within the analysis of laboratory tests. However, it mainly addresses the importance of the generalist pharmacist who works in community drugstores, the importance of knowledge of laboratory parameters for more appropriate guidance, especially regarding the interference of certain medications in the alteration of some laboratory parameters. **KEYWORDS:** Clinical Analysis, Pharmacist, Pharmacy and Laboratories

ABSTRACT

The pharmacist who works in the Community Pharmacy should have knowledge of the pharmacological drug, it's possible biological parameters and interactions with other medicines, applying knowledge of its multidisciplinary curriculum in order to provide a perfect Pharmaceutical Assistance to their patients. The analysis is a branch of clinical pharmacy responsible for the diagnosis of different diseases is undoubtedly a tool of great importance for medicine. This monograph portrays the importance of the professional biochemist, a role he plays within the analysis of laboratory tests. But focuses on the general importance of the pharmacist who works in community pharmacies, the importance of knowledge of laboratory parameters for a more suitable mainly the interference of certain drugs in the alteration of some laboratory parameters. **Keywords:** Clinical, Pharmacist, Pharmacy and Laboratories

1. INTRODUCTION

Clinical analysis is one of the most important means of diagnosis carried out by properly regulated health professionals, which consists of carrying out various activities such as: laboratory, toxicological examination, quality control and management of clinical laboratories, assistance in clinical analysis, detection of certain substances or microorganisms in samples of biological products such as saliva, blood, feces, urine, etc. (SOLEO et al, 1990).

In this area there are different types and forms of tests that the pharmaceutical professional can carry out within the laboratory service, these being: clinical hematology and its subclasses, coagulation and immunohematology, immunology, biochemistry, microbiology and basic and clinical endocrinology that investigate cavitary effusions such as urine , sperm and cerebrospinal fluid, mycology, basic and clinical parasitology, cytopathology and cytology, molecular biology, human physiology, occupational, environmental and forensic toxicology. (SANTOS MR, 1993).

The pharmacist in the exercise of his profession will be able to guide the patient, as he has knowledge in the area of laboratory analysis, community and commercial pharmacy, and can thus dispense medications when carrying out interpretations of laboratory tests or food analysis, thus providing a properly adequate service (SANTOS MR, 1993).

In the laboratory, the professional must guide the patient on swallowing medications and how it will influence the execution of exams. As an example, we will mention medications that can alter the results of tests, which are corticosteroids and acetylsalicylic acid (RAVEL, 1997).

This monograph aims to clarify the role of the pharmaceutical professional at the drugstore level and correlate its importance with knowledge in clinical analysis, with the aim of providing more adequate guidance on the rational use of medicines.

2. OBJECTIVE

2.1- General objective:

Clarify the role of the pharmaceutical professional who works in drugstores and the importance of their knowledge in clinical analyses, with the aim of providing more adequate guidance on the rational use of medicines in relation to laboratory parameters.

2.2- Specific objectives:

- Clarify the role of the generalist pharmacist x biochemical pharmacist;
- Classify the main medications that can interfere with laboratory tests;
- Address the importance of pharmaceutical care in clinical analyses.

3. LITERATURE REVIEW

3.1 – Pharmaceutical Care in Community Pharmacy

Pharmaceutical care follows the most recent path for certain purposes, as, according to the World Health Organization, it qualifies as professional practice where the patient is the main beneficiary of the pharmacist's actions (SANTOS MR, 1993).

However, it comes to pharmaceutical care where the patient meets with other pharmacists to carry out assessments and monitor the patient and thus check whether the patient is carrying out the treatment correctly (WHO, 1993; ANGONESI, 2008).

According to Fernandes (2000), increasingly the customer is not limited to demanding high levels of quality, but also an organization that cares about listening to them, that is attentive, and is thus able to redesign the service in a personalized way oriented towards the client. In this sense, it is crucial to measure service quality so that this concept can be continuously evaluated and improved, as one of the basic principles of quality is based on the notion of a cyclical and progressive process that is never completed.

With the evolution of society, new technological forms emerge, guaranteeing the execution of new procedures, as, consequently, there has been an increase in society's expectations and consequently an increase in medications administered by patients, which generates the emergence of new complications of diseases arising from the incorrect use of medications leading to an increase in the mortality rate (ANDRADE, 2004; BOFF, 2002).

The Brazilian Pharmaceutical Code of Ethics (Conselho Federal de Farmácia, 2001) governs that the professional must act seeking the patient's health, guiding him in every way.

Their attention depends on a sum of attitudes and responsibilities in addition to demanding skills in providing pharmacotherapy because it aims to achieve therapeutic results, benefiting health and thus guaranteeing patients' quality of life (MARTINEZ, 1996).

To this end, the practice of Pharmaceutical Care involves macro components such as health education, pharmaceutical guidance, dispensing, pharmaceutical care and pharmacotherapeutic follow-up, in addition to the systematic recording of activities and evaluation of results (IVANA, 2002).

This stance requires knowledge, commitment and responsibility from the professional, fruits of academic training and professional experience gained on a daily basis (OLIVEIRA, 2002).

Over a long period of time, the pharmacist manipulated medicines in accordance with the pharmacopoeia and doctors' prescriptions, functions that have now been transferred to large industries. pharmaceuticals. The document published by the WHO states that all pharmacists in the exercise of their profession are obliged to ensure the quality of the service they provide to each patient and good pharmacy practices are a means to clarify and fulfill this duty (MARQUES, 2005).

Since then, progress has been significant. Pharmaceutical Care was initially conceived in the process of individual care, but the Tokyo Declaration (WHO, 1993) expands the beneficiary of Pharmaceutical Care to the general population (STRAND, 2001).

This professional practice is documented. Its impact is clearly assessed as positive in the published results. According to the literature analysis “Pharmaceutical Care: 10 years” carried out by

FERNÁNDEZ-LLIMÓS, (2001).

The countries that contributed to the production of works covering the pharmaceutical sector include Germany, the United States, the Netherlands, the United Kingdom, Spain, Canada, among others. Therefore, we already have an idea of what is happening worldwide in this area. Therefore, access to Pharmaceutical Care may also have contributed to the increase in mortality and morbidity levels associated with the use of medications (STRAND, 2001).

3.2- The Generalist Pharmacist in different areas of activity

In general, the pharmacist is being cited as one of the components of multidisciplinary teams related to health, aiming at the health system as a whole and improving the quality of life of the medication user (IVAMA; JAMARILLO, 2008).

Pharmaceutical professionals are traditional, successors of apothecaries, with experience in the use of medicines, pharmaceuticals and their consequences for the human or animal organism. In general, they can work in a hospital, pharmacy, industry, cosmetics, clinical analysis laboratories, agriculture, pest prevention, transport and drug development and distribution (HENRY, 1999).

In this way, this profession became widespread in the 90s, because in several international meetings that dealt with health, there was a need for greater scope for pharmacists, in order to try to improve health. (IVAMA, 2002).

With this need to improve health, pharmacy education was reformulated, qualifying the pharmacy student to be able to generalize the functions performed by the biochemical pharmacist, to get used to new realities such as public health, responsibility linked to the necessary preparation of reports and opinions and acting also in areas involving toxicology, human reproduction and infertility, environmental pollution control, atmospheric pollution, sewage and water treatments, in addition to the ancient function of preparing medicines (SOLEO et al, 1990).

The Pharmacist is a professional with multidisciplinary training that allows him to work in various areas of healthcare. The current design of the curriculum proposed by the National Curricular Guidelines for the Undergraduate Pharmacy Course (CNE/CES Resolution of February 19, 2002), of the National Education Council - defines the Pharmacist as a professional with generalist, humanist, critical and reflective training , to act at all levels of health care, based on scientific and intellectual rigor. Qualified to carry out activities related to drugs and medicines, clinical and toxicological analyses, control, production and analysis of food, based on ethical principles and understanding the social, cultural and economic reality of their environment, directing their actions towards the transformation of reality for the benefit of society (REIS F, 1993).

3.3- Biochemical Pharmacist and his multidisciplinary role

The importance of the pharmaceutical role in the improvements presented is highlighted, especially in the field of clinical analysis. It is observed, however, that the increasing automation in laboratories, innovation in materials and the entry of multinational groups in the health sector, creating large networks of laboratories, has meant that the presence of pharmacists in laboratories is increasingly smaller (SOARES , 2009).

Pharmacists have been discouraged when they do not see themselves covered in the role what him fits. Since with great automation the work has been carried out largely by technicians (SOARES, 2009).

In the recovery, promotion and maintenance of health, the pharmacist plays a decisive role. Research has evolved a lot and allowed the discovery of many drugs. The therapeutic efficacy has increased and decreased toxic effects. University curricula have changed and followed developments in pharmacology and pharmacokinetics. Studies have been carried out to improve the bioavailability and biotransformation of drugs (HENRY, 1999).

The knowledge of the pharmacist who works in clinical analyzes can be applied in two environments many different. The first is in the laboratory where the tests are carried out, or the clinical analysis site itself. The second concerns the place of dispensation. In community pharmacy, when the medication is delivered to the patient, guidance from a pharmaceutical professional becomes essential. Guiding you on correct use and the possible consequences of inappropriate use. This procedure results in better adherence to treatment and better health recovery (Freitas*et al.*, 2002).

Some dosages are done routinely, such as liver enzymes, waste metabolic, electrolytes, hematological and immunological profile with the aim of indirectly monitoring therapy (RANJ, 2003).

The medication seeks the greatest possible benefit, that is, the least undesirable effect. When you have the expected effect and the lowest possible adverse effect, you can say that the ideal therapeutic dosage has been found. Also called therapeutic window. Some drugs have a very fine line between the minimum and maximum tolerable level, that is, they have a very small therapeutic window. Their levels are very close, requiring strict monitoring by the pharmacist when adjusting doses. For greater safety, the ideal is for the therapeutic window to have a large interval. A dose that exceeds the therapeutic window turns a medicine into poison, because as Paracelsus said, what differentiates poison from medicine are the doses (SOARES, 2009).

Several cutting-edge technologies are available to pharmacists today, such as mass spectrometry, gas chromatography, enzyme immunoassay and many others. There are also simpler ones, such as calorimetry, spectrophotometry, photocalorimetry (HENRY, 1999).

In therapeutic observation, many situations arise, such as: the failure of some drugs even when used within the recommended doses, in which case it is necessary to make a new dose adjustment. Adjusting doses when using anticoagulant drugs requires observing prothrombin time and activity, with such procedures it is possible to have data to adjust the ideal dose (RANJ, 2003; GRAFF, 2006).

The main objective of therapeutic monitoring is to inform the doctor about the ideal plasma concentration of the drug. Such a study must be carried out with a reliable and reproducible methodology, so that any empiricism is excluded and the safest and most scientific results possible are obtained, with the pharmacist occupying a prominent place within the healthcare team (LIMA, 2006).

The national health policy is structured by the Ministry of Health with therapeutic guidelines and clinical protocols for exceptional medicines. These guidelines are in a book prepared by a group of scientists led by professor Paulo Dorneles Picon, from UFRGS. In this you can see dispensing flowcharts that demonstrate the steps to be followed by the dispensing professional in therapeutic monitoring (REIS F, 1993).

In some protocols, the pharmacotherapeutic evaluation of laboratory tests is recorded. In this case, the role of the pharmacist goes from carrying out the exam to dispensing or not dispensing the medication, based on the data collected in the dispensing flowchart (REIS F, 1993).

Some examples stand out, such as the monitoring that is done when using isotretinoin, which is used for acne. Blood count, transaminases and triglycerides are assessed at the beginning of treatment and quarterly thereafter. In anemic patients who have chronic kidney complications, recombinant erythropoietin requires an accurate assessment of the hematological count of iron levels and proteins that conjugate iron. This assessment must be carried out monthly (LIMA, 2004).

Other chronic diseases such as hepatitis B, when treated with alpha interferon and lamivudine, must have as inclusion criteria HbsAg, HbeAg and HBV viral load serological tests, as well as transaminase measurements (HENRY, 1999).

The assessment of renal function is made by endogenous creatinine clearance, which shows the dose of lamivudine to be administered. Platelet and leukocyte counts provide exclusion criteria for alpha interferon treatment. If there is a marked decrease, treatment should be reduced to a lower dose or even interrupted (GOODMAN & GILMAN'S, 2001).

It is the role of the pharmacist within a clinical analysis laboratory to always question the patient about the appropriate use of the medication they are using. This allows the dispensing professional to monitor the results of the tests more accurately. Some medicines such as acetylsalicylic acid or corticosteroids, cause changes in test results, which can lead to an interpretation wrong on the part of the doctor. To avoid misinterpretation, the pharmacist must always include, together with the test results, information collected from the patient about the medications being used and the changes they may cause (LIMA, 2004).

More than ten years after the definition of national curricular guidelines for teaching pharmacy and the proposal for training generalist pharmacists, many still do not understand its advantages. As a starting point for this discussion, a question is worth asking: who should decide whether these changes are advantageous, us, the pharmacists or the society that receives the services we provide? We know that in practice the status of a profession is defined by society. The profession must serve society in its desires and needs.

If this occurs, you will receive support and compatible value (REIS, 2007).

Therefore, a second question is worth asking: which professional is more qualified to meet society's needs in terms of what it needs: the generalist pharmacist or the specialist. Let's look at some hypothetical situations. A user, when purchasing a medication at a pharmacy, asks the pharmacist to provide guidance, in addition to the correct administration of medication, regarding the results of some tests that the user brings with them. He responds that he cannot help you considering that he did not undergo clinical analysis (Freitas*et al.*, 2002).

In a multidisciplinary team meeting, the pharmacist who works in clinical analyzes is required to provide information from the pharmacist about the possible adverse reactions of the drug under study, given suspected incompatibilities between the drug and the tests. The pharmacist does not feel safe passing on such information to the team considering that his area of expertise is only clinical analysis. These are facts that illustrate the discussion well (SANTOS, 2003)

When seeking guidance from the pharmacist, the customer expects to obtain extensive information regarding medications and tests and also information about the disease they are suffering from (Freitas*et al.*, 2002).

It is clear that the pharmacist must work in an integrated manner with the multidisciplinary team, contributing to the recovery, promotion and maintenance of health. It can be concluded that the training of a generalist pharmacist has advantages when it allows a broad understanding of the patient. The possibility of generalist pharmacists receiving sufficient information about different areas, such as food, clinical analyzes and medicines, is questioned. When observing the curricula of pharmacy courses, it is clear that the contents of biological sciences are the basis for understanding the three areas that make up generalist training (OLIVEIRA, 2002).

Teaching without emphasizing this or that area of the teacher's specialty can be learned by the student without problems. In the same way, the teaching of chemistry is seen in the interactions of drugs with their receptors and in the biosynthesis of drugs throughout the digestive tract (OLIVEIRA, 2002)

Some microorganisms used in the food industry are studied in microbiology. The isolation and cultivation techniques are similar. Some differences only appear in the culture medium used (LIMA, 2004).

Approximately 25% of tests requested by a doctor in a hospital are in some way related to some unwanted effect of a medication. In the food industry, some concerns are routine. Therefore, the generalist pharmacist obtains better academic training to work in a multidisciplinary way, meeting society's desires more efficiently (REIS, 2007).

The biggest challenge to be faced is in the training of this professional. The first step is in the view of the professors, who are mostly specialists in a specific area and do not have a broad view of the pharmaceutical field. The structure of undergraduate pharmacy curricula makes the situation even worse, which hinders the formation of integrated knowledge, which is extremely important for different work fronts (Freitas*et al.*, 2002).

The strong culture of technical training is a limiting factor, since the practice of a professional with generalist training requires several skills associated with human training, with criticism, reflection, communication, proactivity, etc. This is attributed to the fact that experts are intolerant of change. The main difference can be seen in the way content is studied and in the commitment of teachers and students to the new paradigm (Freitas*et al.*, 2002).

3.4 - Medication interference in laboratory tests

Pharmacy and Biomedicine are two areas of knowledge that, when together, offer information about the results obtained in laboratory tests as diagnostic methods, and a more accurate view in effective ways, with fewer side effects, to offer a given treatment (YOUNG, 2010).

When analyzing the biotransformation and action of medicines in the body, it is known that these procedures cause some changes in the organic functioning itself and also produce metabolites that may or may not be active. Metabolites rely on the help of the circulatory system for transport, the urinary system, among other systems (YOUNG, 2010; RANJ, 2003).

When carrying out diagnostic laboratory tests, the material used, in most cases, is blood and urine. The exams look not only at the type, but also at the amount of substances that

indicate or quantify to define the diagnosis of a given pathology. These substrates and drugs are of chemical origin and often resemble each other in structure. The equipment used in diagnostics and reagent kits use this chemical information to find and measure them, even though they are not as efficient in differentiating them. Thus, some drugs can be identified as another substance, causing an erroneous result (WALLACH, 2008; TAVARES, 2005).

It is observed that medications cause interference in the perfect functioning of the body during the period of use, depending on which medication is used. This lack of control in the body can also lead to erroneous laboratory results (LIMA, 2004; YOUNG, 2010).

It is known that in the population, each individual uses several medications indiscriminately. Information about these drugs that interfere with laboratory tests is very important so that the health professional can correctly diagnose a certain pathology, and offer the individual a more efficient therapy, without the abusive use of medications. It is common for doctors to seek information from laboratories, questioning the results of the tests because they do not correspond to the patient's clinical status. Despite the most sophisticated and modern equipment and professionals increasingly qualified to carry out analyses, the interference of medications in laboratory test reports still causes false-positive results. Masked diseases, under or overestimated quantifications may be caused by the use of certain medications not previously communicated to the pharmacist who is performing the examination, which may be responsible for the wrong diagnosis (YOUNG, 2010).

The information about what is considered a medicine by those who are using the medicine is often where the problem lies. When requesting the exam, the doctor always asks whether the citizen is using any form of medication; however, when the patient uses syrup, antacids and aspirin, they generally do not mention them because they do not find a direct association of these medications with what their mind considers as medicine (PICON, 2002).

In thyroid exams, the use of iodine such as syrups, expectorants, topical preparations, and radiological contrasts can cause interference in the results. Iodine inhibits the secretion of thyroid hormones giving a false diagnosis of hypothyroidism. For tests to measure circulating sugar levels, care must be taken when combining acetylsalicylic acid with insulin. Aspirin is an example that can enhance the effect of insulin and give a false error in the result, resulting in a low glucose result (PICON, 2002; TAVARES, 2005).

It is known that in a certain way, each individual uses a very wide variety of medications. Information about these medicines is vitally important for healthcare professionals. Allowing him to diagnose, more accurately, a certain pathology, and offer the individual a more appropriate treatment, without the irrational use of medications (TAVARES 2005).

The interference of medications in test results was one of the topics discussed at the XVI São Paulo Congress of Pharmacists. Acetominophen and some corticosteroid anti-inflammatory drugs interfere with glucose levels. It is not uncommon for an altered test result to be found without a logical clinical explanation. Most of the time it is because the patient is taking some medication and has not informed the pharmacist about its use. In these cases, it is common to blame the laboratory for the erroneous result, as the test can be repeated elsewhere and presents more accurate results. Changes can occur either in the organism or in the chemical reaction during sample analysis. The guideline is to always take all drugs used in the days before the exam to the laboratory. This way, the examination can be more precise for each case presented (WALLACH, 2008).

For those who are using antibiotics or anti-inflammatories, it is advisable to take the medication and, 3 to 4 days after finishing, take the requested tests (WALLACH, 2008).

Laboratories are also advised to have a list with the name of the medicines so that, if the patient brings the medicines, they can be recognized more easily. The professional who will take the exam should advise that certain teas contain paracetamol and that patients often do not believe that the tea was a medicine and that in high doses it can interfere with exam results (REIS, 2007).

According to Darcy (2003), thyroid hormones are the most affected. See some examples of changes caused by medicines:

- Amiodarone: the medicine used for patients with cardiac arrhythmia.

type of change it causes: Interferes with thyroid hormones. It occurs in patients who do not present clinical changes and also in those who present changes in the functioning of the thyroid gland.

- Propranolol: used to treat patients with hypertension.

Change caused: causes changes in liver enzyme dosage tests and urea dosage.

- Ketoconazole: Antifungal active ingredient. Change caused: causes changes in enzymes hepatic. People who use oral anticoagulants, if they also use ketoconazole, will have an increased effect, significantly interfering with tests that measure prothrombin time.
- Piroxicam: anti-inflammatory. Types of changes caused: cause an increase in blood glucose. In In normal patients, it leads the doctor to diagnose false diabetes, and in those already known to be diabetic, it can increase the dosage result too much.
- Paracetamol: Analgesic and antipyretic. Changes caused: falsely induces a result decreased blood glucose.

When unexpected results occur in laboratory tests, it is advisable to consider the existence of drug interference, as a large number of medications are capable of influencing test results (DARCY, 2003; GRAFF, 2006).

Medications can also influence the results of chemical and hematological tests: In vivo: biological effects, both side effects and the main effect. Therefore, when a change is noticed, one form of investigation is to change the methodology. There are several times when the use of the medication goes unnoticed and its use is not reported in the laboratory. This is the case, for example, with vitamin supplements. Vitamin C can easily interfere with glucose, hemoglobin and nitrite tests in urine, and can even negatively affect occult blood tests in feces. It also has the power to interfere with serum creatinine levels. It is clear that the ideal would be for patients to suspend the use of Vitamin C for at least 24 hours before collection. A situation that happens a lot is seen regarding the use of medications for weight loss, which is understood by many patients as not being a medication and which may contain active ingredients such as diuretics and thyroid hormones (DARCY, 2003; PICON, 2002).

Knowledge of the great interference capacity of medications is essential when highly variable results are suspected. When this happens, the right thing to do is to contact the laboratory that carried out the tests. With information about potential interferers and information about the methodology used, the pharmacist and doctor must choose, together, actions that lead to better clarification about the variations:

- Repeating the analysis with another sample collected after stopping the use of the medication;
- Changing the methodology used, still using the same sample from the previous analysis;
- Take into account the interferences of the results in light of the expected interferences (positive or negative) (WALLACH, 2008).
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4. Methodology

This work is based on an exploratory bibliographic study, observing and seeking to understand the level of understanding of the pharmacist who works in commercial drugstores and the biochemist who works in the laboratory through research in scientific articles, books and periodicals.

5. CONCLUSION

As shown by Vieira and Hossne, (2001). Cross-sectional observations are made to describe individuals with respect to their personal characteristics and their histories of exposure to suspected factors at a given time.

It also notes that observational studies are carried out with the aim of identifying risk factors for diseases, discovering their side effects and evaluating public health policies.

From the studies carried out, there is a relationship between the studies carried out and the possible laboratory findings, already disseminated in scientific publications, showing the need for more specific studies in inter-professionality between the dispensing and carrying out of exams, in this aspect currently, there are few studies, however, prior observation can direct future experimental studies, necessary for the evolution of this knowledge.

There is also a need to expand these studies, among pharmaceutical professionals who work not only in commercial pharmacies, but also in community drugstores and who daily come across patients at the counter wanting information about medications and the interference caused by them in parameters. more routine laboratories.

These bibliographical researches showed that many drugs directly interfere with certain exams, and a professional with enough knowledge to inform and clarify at a pharmacy counter would be a considerable advance in avoiding some errors in diagnoses.

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