

ESTeSC – Coimbra Health School

Poster Week 12/2019

Abstract Book



ESTeSC

Escola Superior de
Tecnologia da Saúde de Coimbra

November 18th – 22th, 2019

SCIENTIFIC COMITEE

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INDEX

Abstract number	Discipline	Program
A1 – A10	Pharmacoepidemiology and Public Health	Pharmacy
A11 – A24	Galenic Technology and Pharmacy I	Pharmacy
A25 – A36	Nutrition and Public Health	Dietetics and Nutrition
A27 – A45	Organization Management and Quality in Pharmacy	Pharmacy
A46 – A52	Immunohemotherapy Clinical and Laboratory II	Biomedical Laboratory Sciences
A53 – A61	Physiology I	Physiotherapy
A62 – A71	Nutrition and Dietetics	Dietetics and Nutrition
A72 – A79	Introduction to Pharmacy	Pharmacy
A80 – A88	Nutrition	Pharmacy
A89 – A95a	Introduction to Environmental Health	Environmental Health
A96 – A102	Morphology and Histotechnology	Biomedical Laboratory Sciences
A103 – A115	Genetics	Dietetics and Nutrition
A116 – A123	Oncobiology	Biomedical Laboratory Sciences
A124 – A131	Nutritional Composition of the Foods	Dietetics and Nutrition
A132– A135	Applied Research in Clinical Physiology	Clinical Physiology

PROGRAM

Calendário

Poster Week 12/2019

	2ªf		3ªf		4ªf		5ªf		6ªf
	18/nov		19/nov		20/nov		21/nov		22/nov
8-9h									
9-10h	Cristiano Matos: 10P Curso: Farmácia UC: Farmaco epidemiologia e Saúde Pública		Paulo Matafome: 9 P Curso: Fisioterapia UC: Fisiologia I		Ana Lúcia Baltazar: 5P Curso: Farmácia UC: Nutrição	Cristiano Matos: 8P Curso: Farmácia UC: Introdução à Farmácia	Fernando Mendes: 8P; Curso: CBL; UC: Oncobiologia		
10-11h				Fernando Mendes: 7P Curso: CBL UC: Imunohemotera pia Clínico Laboratorial I	Hélder Simões: 7P Curso: SA UC: Introdução à Saúde Ambiental				
11-12h	Jorge Balteiro: 14P Curso: Farmácia UC: Tecnologia e Farmácia Galénica I								
12-13h						Sónia Fialho: 8P Curso: DN UC: Composição Nutricional dos Alimentos		Joaquim Pereira: 4P Curso: Fisiologia Clínica UC:Investigação Aplicada 1	
13-14h					Diana Martins: 7P; Curso: CBL; UC: Morfologia e Histotecnologia			João Lima: 2P Curso: DN UC:Nutrição e SP	
14-15h	João Lima: 10P Curso: DN UC:Nutrição e Saúde Pública		Ana Faria: 10P Curso: DN UC: Nutrição e Dietética	Célia A. Gomes: 13P Curso: DN UC: Genética	Workshop: Escrita Científica			Ana Lúcia Baltazar: 5P Curso: Farmácia UC: Nutrição	
15-16h		Rui Cruz: 5P Curso: Farmácia UC: Organização, Gestão e Qualidade em Farmácia						Rui Cruz: 5P Curso: Farmácia UC: Organização, Gestão e Qualidade em Farmácia	
16-17h									
17-18h									
18-19h									

DRUG SPENDING AND IT'S CONTROL

Ana Rita Ferreira, Beatriz Marques, Catarina Seixas, Gabriela Teixeira e Maria Maia

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Health is the area that causes the greatest expense to the Portuguese State, namely the dispensation of medicines. The drug costs vary widely, as we are constantly discovering new medicines. Therefore, INFARMED,I.P. is responsible for controls the drug budget management. AIM: The objective of this study is to realize the money spent on treatments and which areas in health have greater relevance in this aspect and how this situation is controlled.

Material and Methods:

The agency responsible for drug management is INFARMED,I.P., which is part of the Ministry of Health, but with its proper autonomy. In addition to having other skills, also evaluates the cost-effectiveness of drugs, seeking that their effectiveness is made at low cost.

Results: Expenditure on medicines in 2010 and 2018 was respectively 1,639.3 and 1,255.0 million euros, showing a decrease in recent years, although costs remain high.

Patients had expenses on medicines, and in 2011 the amount was 798.6 and in 2018 was 711.1 million euros. As regards medicine packaging, expenditure in 2018 amounted to 161,315 thousand euros.

The main unit responsible for drug consumption are hospitals. In July 2019 there was an expenditure of 778 million euros, of which 232 million were from the oncology area, followed by amyloidosis and the locomotor system. The IPO's of Coimbra, Lisbon and Porto showed the largest increase in costs compared to 2018.

Conclusion: In short, drug spending remains a major concern for us to be able to treat, but more effectively and cost-effectively.

Keywords: Drug Control; Drug expenses; Oncological drugs.

PREVENTION AND CONTROL OF INFECTIONS AND ANTIMICROBIAL RESISTANCE IN A HOSPITAL SETTING

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WHO consider antimicrobial resistance an issue for public health, the infection rates associated to healthcare are responsible for increasing comorbidities and mortality , prolonged hospital admissions , and increased costs of healthcare.

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Once the treatment of infection is due to the use of antimicrobials, their continuous and inadequate usage could lead to microbial resistance.

Keywords: Antimicrobials, control and prevention of the infections , hospitalar infection, resistant bacteria.

PHARMACOVIGILANCE AND ADVERSE DRUG REACTIONS

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Pharmacovigilance is the science relating to the collection, detection, assessment, monitoring and prevention of adverse effects or any other problem related to drugs focusing on increasing drug safety that protects both, patient and public health. The adverse drug reactions (ADR) are defined as any response to a drug which is noxious and unintended, can be related to situations where the drug is intentionally used for a medical purpose but not in accordance with the terms of AIM (off label use), when the administration of a drug is above the maximum dose recommended by the AMI, (overdose) or when the drug is intentionally and inappropriately used outside the terms of AMI (bad use).

The SNF (National Pharmacovigilance System) monitors pharmaceutical products, licensed to be distributed nationally, evaluating any adverse drug reaction and apply safety measures through a signal detection that consists of reported information on a possible causal relationship being unknown or incompletely documented previously. We focus on pharmacovigilance in pediatric medications as children may manifest adverse reactions that do not occur in adults due to the nature course of the disease and undesirable reactions may differ in both age groups. A future path to follow in pediatrics is undoubtedly towards the synergy and coordination of all components of Pediatrics for the organization of research projects and post-marketing programs.

Lastly, the main objective is to alert and raise awareness of the importance of reporting any symptoms that are not expected, as it may make a difference and help detect undiscovered changes.

Keywords: Pharmacovigilance; Adverse reactions; Pediatric drug

MEDICATION ERRORS

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Medication errors represent a sad reality in the work of health professionals, with serious consequences for patients.

Medication error is an important cause of patient morbidity and mortality. It is any error that occurs at any point in the medication use process.

A well-structured medication system should promote conditions that help minimize and prevent errors, implementing norms, rules, actions, processes in order to assist the professionals involved.

Medication errors can occur in several stages: during prescribing, preparation or administration. These stages result in errors in the administration, dosage errors, errors in parenteral nutrition, changes in patient identification and prescription discrepancies. Inattention, individual failures, and problems in service administration are important reasons of the causes of errors.

Methods to prevent medication errors from occurring (use of information technology, better drug labelling, and medication reconciliation) have been used with varying success

The drug safety also known as pharmacovigilance is defined "as the science and activities relating to the detection, assessment, understanding and prevention of adverse effects or any other drug-related problem".

AIM: The objective of this review is to describe the main reasons for occurrence of medication errors.

Material and Methods: This review was based on two articles on "PUBMED" and "Google Scholar" databases.

Results: Wrong selection of the prescribed medication leads to the occurrence of preparation errors. The administration error is related to dose failure, route of administration and technique used.

Conclusion: To reduce the occurrence of medication errors in the future, it's necessary to improve communication between stakeholders of drug circuit, including healthcare professionals and patients.

Keywords: medication errors, prevent errors, pharmacovigilance, administration errors, dosage errors

SELFMEDICATION IN ELDERLY

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Elderly people are more vulnerable to self-medication, as they usually use more medicines than other age groups. In addition, it is noted that the use of medicines almost triples with advancing age and this fact is justified by the lower tolerance to acute symptoms.

AIM: The aim of this review is to realize the importance and danger of self-medication in the elderly and the adverse reactions they may cause in our organism.

Material and Methods: This paper is based on articles found on search engines: Google Scholar, PubMed between the years 2013 and 2018.

Results: Based on the prevalence of a study of 100 elderly aged 60 to 69 years of age, prevalence in relation to self-medication, 67% of the elderly said they had already performed this practice at some point of their lives. The prevalence of self-medication was higher in females (68.65%) than in males (31.35%).

Conclusion: Many elderly people self-medicate because they do not seek medical advice, and because they are more fragile, they end up increasing the emergence of sometimes serious illnesses through drug misuse.

Keywords: elderly automedication elderly drug, prevalence self-medication, adverse reactions automedication

FALSIFICATION OF MEDICINES AND COUNTERFRACTION

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Counterfeit medicines are medicines with credible-looking packaging that in no way guarantee their safety, quality or effectiveness. It is common in these supposed drugs to find wrong dosages and active substances out of specification or counterfeit, toxic substances or even no active substance. According to OMS, a counterfeit drug is "a drug deliberately and fraudulently labeled with respect to identity and / or source." This is a serious problem that endangers the public health and life of consumers of these products.

The purpose of this work is to present the reality about counterfeit medicines, alerting the less informed public to this threat and its possible consequences.

For this review, we used documents taken from the official website of the "SNS" of Portugal in October 2019.

In order to ensure the safety and quality of medicines sold in the EU, it is now necessary for industry to place a 2-D barcode, preventing tampering on the box of prescription drugs. Another way to combat counterfeiting is Operation Pangea.

Counterfeiting drugs is now a real and present problem in our daily lives, not only in third world countries but also in more developed countries. As health professionals, participants in the entire circuit of the medicine, taking into account our knowledge of them and our proximity to the patient, it is also up to us to provide our advice, alerting to this problem.

Keywords: Forgery; Counterfeiting medicines; Public health.

THERAPEUTIC RECONCILIATION IN THE POLYMEDICATED ELDERLY

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Studies conducted in recent decades showed that high drug consumption increases the appearance of adverse events related to medication, and may present a serious health risk. Medication errors are the most frequent adverse events and have economic and social repercussions. There are more critical problems related to communication at patient care transition points, for example, the transition of the hospital to a nursing home. The elderly are a vulnerable population group, because, in general, they are people with more chronic health problems, leading to the consumption of a higher number of prescribed medicines. So, polymedication can lead to various problems such as the high potential for adverse effects and interactions, inadequate use of medication or non-adherence to treatment, which results in an increased risk of morbidity and mortality, which consequently increases economic costs. From these data it became relevant to create strategies to reduce this serious problem, emerging in this context, the concept of Therapeutic Reconciliation.

A careful review and correct analysis of the patient's medication ensure that any introduction, alteration or even interruption of a drug is evaluated effectively, protecting it from possible adversities. This is how reconciliation is seen as the most important means of detecting and preventing adverse events.

It is clear that this system is an important tool worldwide as it allows to improve patient safety through a process designed to identify and prevent medication errors in all healthcare interfaces. We aim to make known how the implementation of Therapeutic Reconciliation, in polymedicated elderly in hospital stay.

A bibliographic research was conducted to select the desired information in Google® Scholar® based on a 2015 opinion piece and 2013 and 2018 monographs.

Keywords: reconciliation, medication errors, polymedication, morbidity and mortality.

SAFE USE OF MEDICINES

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Medicines are fundamental in the health system and are prevailing in treatment of diseases. Managing them is a complex and multi-step process that encompasses a series of decisions and actions involving professionals from various disciplines as well as the user himself. The objective of this review is to sensitize patients for better drug use.

For the preparation of this work we used the Ggoogle Scholar® academic database on October 19, 2019, where the keywords “safety” and “medicine” led to a total of about 133,000 results. Of these, we based on 4 scientific articles to understand the theme and to reach the final result that is this work. The use of medicines involves a set of processes and patient safety should always be the most important aspect within organizations. Incorporating technological advances and taking measures in direct patient care is not an easy task, but it helps to prevent adverse events, improving the quality and safety of patient care. Thus, we realize that there are medication errors, which should be seen as a phenomenon that covers many professionals, and that together they must share the responsibility to prevent these errors, identifying and correcting factors that contribute to their occurrence.

Keywords: Safety, Use of Medication and Medication Errors.

ENSURE SYSTEMATIC PRACTICE OF REPORTING, ANALYSIS AND PREVENTION OF INCIDENTS

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Currently, in order to ensure that healthcare is carried out rigorously and results are satisfactory, a high level of patient safety must be sought.

One of the strategic objectives of the World Health Organization and the European Commission is to ensure systematic reporting, analysis and prevention of incidents. The reporting of security incidents is one of the priority tools for the identification of risks, hazards and possible vulnerabilities of a health organization.

Neonatology is no exception, so an anonymous, non-punitive system for reporting adverse events and incidents adapted to a Neonatal Unit is very much needed.

AIM: In the specialty of neonatology, the chosen theme aims to verify whether a reporting system is efficient in preventing incidents and which incidents are more prevalent in neonatal care units.

Material and Methods: This study is based on literature reviews and previous studies and their subsequent analysis in order to verify the efficiency of reporting in neonatal health care.

Results: The implementation of an adequate reporting system allows us to determine which areas of potential risk and where the greatest number of adverse events occur, with medication and ventilation being the areas with the higher number of incidents.

Conclusion: Patient safety and the safety incident reporting system are common goals and of great interest to healthcare providers, resulting in improvements in the quality of services provided and patient safety.

Keywords: Healthy safety, Security, notification, health system

ORPHANS MEDICINES AND FABRY DISEASE

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Over the years there has been an overwhelming technological development, which has allowed enormous progress in areas such as medicine and pharmacy. Thanks to this evolution, the diagnosis of rare diseases has become possible and consequently a search for its cure.

Fabry disease is a rare inherited disorder where patients have various mutations in the gene responsible for the production of an enzyme called alpha-galactosidase A and affect between 1 and 3 out of every 100,000 live births.

AIM: The aim of this study is to know the use of orphan drugs on Fabry disease and its prevalence in the EU.

Material and Methods: For this review, we used articles published in the database EMA, Orpha, Google Scholar with information of the last 5 years. We selected 6 articles of which we use all of them.

Results: In this disease, it uses a copy of our DNA for the enzyme in the case to replace it, to treat the disease. The medicines used are Galafold, Fabrazyme, Replagal.

Conclusion: Thanks to science, now it's possible to find a cure or treatment for rare diseases and provide a better life for people.

Keywords: Rare Diseases; Orphan Medicinal Products; Fabry Disease

HISTORY OF THE PORTUGUESE PHARMACOPOEIA

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The Portuguese Pharmacopoeia is the official document that defines the rules and technical requirements to be met by raw materials and substances for pharmaceutical use as well as the analytical methods to be applied in the production of medicines in Portugal. The elaboration, revision, updating and interpretation of the Portuguese Pharmacopoeia is the responsibility of the Portuguese Pharmacopoeia Commission, an advisory body to INFARMED IP.

In the past, pharmacopoeias were focused on the production of medicines at the workshop level; now the guidance is on the analytical domain.

Between 1704 and 1794, some pharmacopoeias were published but of unofficial character. In 1794, the first work of an official nature was published by Francisco Tavares, physician at the Faculty of Medicine of the University of Coimbra.

During the 19th century, and until the first half of the 20th century, three pharmacopoeias were published in Portugal: the Lusitano Pharmaceutical Code (1835) by Agostinho Albano da Silveira Pinto, the Portuguese Pharmacopêa (1876) prepared by a commission appointed for this purpose, and the Portuguese Pharmacopoeia IV (1936) published by a commission of doctors and pharmacists. In 1946 the second edition of this last Portuguese Pharmacopoeia was published.

Subsequently, new editions were published in 1986, the V official Pharmacopoeia, which foresees the adaptation to Portugal of the European Pharmacopoeia, the VI official Pharmacopoeia in 1997, the VII in 2004, the VIII in 2005, and the IX in 2009, which is still in force today. New editions should appear due to various technological advances and the need to reshape or add more up-to-date information to this important document.

Keywords: Portuguese Pharmacopoeia; INFARMED IP, History

REMEDIES: CONCEPTS AND TYPES

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Daily, the word remedy is often used as a synonym of medicine, by citizens and the media. However, these are two different concepts.

To better distinguish medicine from remedy, it is frequent to hear the expression: "Every medicine is a remedy, but not every remedy is a medicine."

Medicines are composed of substances that have a scientifically proven efficiency and have passed by a rigorous technical control, that intend to prevent, cure, diagnose or reduce the symptoms of a given disease.

On the other hand, remedies offer a wider definition, since their efficiency does not require scientific proof, due to the fact that they do not present quality control. They intend to cure or ease the symptoms of a given illness.

Some examples of remedies are: homemade tea, massages, baths, use of herbs, homemade ointments, healthy eating, nutritional supplements, sea water, physical activity, meditation, sun bathing, friendly dialogues, inter alia.

Remedies can be classified in three types: social, psychological and physical.

A lot of people choose remedies that are not medicines, due to the fact that these present fewer collateral effects and a lower cost than medicines.

Keywords: Remedy; medicine; therapy

ALLOPATHIC VS HOMEOPATHIC MEDICINES

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Allopathic medicines and homeopathic medicines differ in the mode of action, in which allopathy seeks to produce a reaction against the symptoms that the patient's body presents, in order to reduce or neutralize them, while homeopathy fights disease with the administration of drugs that cause these same symptoms, promoting a response of the body.

Allopathic medicines are produced in large quantities in the pharmaceutical industries at predetermined doses, but when necessary, due to the lack of dosage the patient needs in the market, it's produced in the right dosage at pharmacies.

Homeopathic medicines are prepared according to the processes registered in the official pharmacopoeias, from various dilutions, because the primary substances may be potentially toxic.

Simultaneous use of homeopathy with allopathy can be advantageous since homeopathy, in one hand, stimulates the body to heal, while allopathy acts on the patient's symptoms and fights the pathological mechanism that causes the disease. Thus, homeopathy, as an individualized therapeutic approach, can add efficacy, effectiveness and safety to conventional medicine, with curative or preventive action and minimal adverse effects.

Keywords: Allopathic medicines; homeopathic medicines; advantageous

MAGISTRAL PREPARATION VS. OFICIAL PREPARATION

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With the evolution of pharmaceutical technology, most of the medications available on the market are produced by the pharmaceutical industry. However, there are medicines, called manipulated, whose preparation is the responsibility of the pharmacies both Community and hospital.

Within these, there are the official medicines and the magistral. The drugs that are available to the whole population in specific dosages and which we acquire in pharmacies, produced according to a Pharmacopeia or by another recognized form, are called the "oficial preparations". On the other hand, the drugs that are prepared specifically for the treatment and for a particular wearer, through a prescription and rigorous preparation by a duly instructed responsible, are the so-called magistral preparations.

The manipulated medications have several advantages, among which is the ease of administration and to adjust the doses intended for each patient.

Like the other medications, in the act of prescribing and dispensing a masterful or workshop preparation, one should always be aware of safety, verifying possible interactions, and ensuring that all relevant information is provided to the patient.

Keywords: Manipulated medications; Magistral preparation; Oficial preparation

DRUGS VS PHARMACOLOGICAL SUBSTANCE

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The difference between the concept of drugs and the pharmacological substance is very little known to the general population and is even used indiscriminately. The knowledge of this difference is important to realize that drug is not always something harmful to the body and that the difference between them may be the purpose in its administration, the effect of its dosage may have and also its study on the effects on the body. It is also important to know the concept of pharmacokinetics because it is one of the main branches of pharmacology, which aims to study the absorption, distribution, biotransformation and elimination of pharmacological and drug substances. Knowledge of drug behaviour in the body assists in pharmacological/toxicological analysis, dosing regimen and clinical efficacy and toxicity studies. At the end of this work we can expect an understanding of the difference between these concepts, how a drug can be beneficial or harmful and its form of action, and how a pharmacological substance can behave like a drug and an overall analysis of pharmacokinetics.

Keywords: Drug, pharmacological substance, pharmacokinetics, toxicology

THE IMPORTANCE OF EXCIPIENTS IN PHARMACY

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Excipients are a simple adjuvant and vehicle, chemically and pharmacologically inert that over time have played an increasingly important role in pharmacy. Nowadays, they are considered essential to ensure the best performance of the drug, in order to optimize the therapeutic effect and make it possible to obtain safer and stable pharmaceutical forms. This promote not only the attributes related to their safety, but also the effectiveness of the product, from its storage to is consumption. The use of excipients may merely be a way of administering properly the desired dose to the patient, or may have as its mission the release or time of action of the drug in the body. The excipients can perform various functions according to their role in pharmaceutical forms, being classified as diluents, binders, disaggregated, lubricants, and preservatives, among many others. Other optional components are colorants, flavorings and sweeteners. Generally, excipients represent the most part of the pharmaceutical form (relative to is weight volume), when compared to the concentration of the active principle of the drug. Therefore, the excipients must be non-toxic and compatible with the formulation and must remain stable throughout their useful life. Being then essential to know all the properties and effects of these excipients.

Keywords: Excipients; pharmaceutical forms; pharmacy properties.

GALENIC FORMS: WHAT IT IS?

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Galenic forms are the final state of active substances, after undergoing the necessary pharmaceutical operations.

According to their physical state, it is possible to divide them into solid, liquid, semi-solid or gaseous forms. The choice of these has as aim to facilitate administration, to protect the drug during passage through the body and to ensure the accuracy of the dose and its presence at the site of action, in order to obtain the greatest therapeutic effect.

Within the solid forms there are powders, granules, tablets, effervescent, capsules, suppositories, ovules and pills. Liquid forms include solutions, suspensions, syrups, elixirs, emulsions, eye drops and ampoules. In the semi-solid forms we have the gels, ointments, creams, plasters and finally in the gaseous forms are the aerosols, sprays and nebulizers.

Galenic forms have different characteristics that make possible to adapt to the patient's clinical situation. For this we have to take into account the physicochemical nature of the drug, type of action, types of drug administration pathways, type of effect desired, and therefore to accomplish progress in the treatment of pathologies and / or improvement on quality of life.

Keywords: Galenic forms; Active substance; Solid forms; Liquid forms; Semi-Solid Forms

PHARMACY IN MEDIEVAL TIME

Carolina Silva; Elsa Silvestre; Timóteo Ladeira

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The collapse of the Roman Empire in the West begins the Medieval Era, marked in pharmacy through a setback in the practice of healing, derived from the poor development and cultural, demographic and economic evolution, returning to religious beliefs.

However, the Arab influence contributes positively in pharmacy, as they advocated a pharmacy facing the laboratory, having had a decisive action in Christianity and convents. The monks, knowledgeable of herbariums of classical authors, applied this knowledge to the cultivation of medicinal plants in botanical gardens. It's also at this time that the first authorizations for the art of preparing medicines in their own establishment - the apothecaries - arose, as well as the founding of the first universities, under the control of the Catholic Church, reinforcing the teaching of hippocratic and galenic medicine.

In the Middle Ages apothecaries appear as specialists in the preparation of medicines, distinguishing themselves from doctors who specialize in the area of patients.

In 1240, through the “Magna Carta da Farmácia” promulgated by Frederick II, the pharmaceutical profession is legally recognized, thus separating it from the medical profession.

Throughout the Middle Ages, there has been the perpetuation of classical medical matter, in which myth, magic, and belief played a decisive role in medieval pharmacy and medicine. Nevertheless, despite this, the pharmacy has achieved important achievements at this time, such as the separation of the medical and pharmaceutical professions, the emergence of a physical establishment for the exercise of pharmacy and the introduction of pharmacopoeia into the profession.

Keywords: Pharmacy; Medieval Era; Middle Ages

BIOAVAILABILITY: CONCEPT AND IMPORTANCE

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Bioavailability is the amount and rate of absorption of the drug into the bloodstream. It is not constant for all medicines, on the contrary, it depends on the dosage form, the difference between formulations, age, physical activity, weight, disease, surgery of the gastrointestinal tract, sex of the person and route of administration. In the case of orally administered drugs the bioavailability tends to be low which potentially means that the intended total effect on the body may not be achieved.

Bioavailability is evaluate by the AUC - area of the plasma concentration to time curve after an oral dose of drug where the maximum plasma concentration (peak) is the main factor in the evaluation of drug absorption, as, reveals its speed. As bioavailability the percentage of absorbed substance varies depending on the purity of the drug, the type of salt used, the ideal absorption pH, the presence of certain substances in the gastrointestinal tract and others.

Keywords: Bioavailability, therapeutic effect, drug, absorption

BIOEQUIVALENCE – CONCEPT AND IMPORTANCE

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The quality of a drug is ensured by bioavailability and bioequivalence, assuming an important role in the clinical efficacy of a drug.

Bioequivalence is based on a comparative bioavailability study between two or more designated equivalent or similar pharmaceutical products containing the same active substance, dose and pharmaceutical form. Drugs are said to be bioequivalent if they are essentially similar, if after administration they reach the systemic circulation at the same rate and to the same extent and if the effects on efficacy and safety are the same.

The bioequivalence study is conducted on a small number of individuals based on prior knowledge of drug variability and should ensure product identity with respect to the absorption rate and amount of drug absorbed and is arranged in three separate study and analysis steps.

After performing the bioequivalence study, an alternative solution for clinical efficacy testing is presented, this is the way the drugs are approved and selected for commercialization.

Similar drugs are of high relevance to public health and socio-economic interests, and the creation of mechanisms and tools to ensure that similar drugs, also referred to as generic drugs, have the same characteristics, properties and qualities, is of great importance. The reference drug, with the advantage of lower cost, leading many countries to use generic promotion as one of the measures to reduce the growth of drug expenses.

Keywords: Bioequivalence, Active Substance, Similar Drugs, Generics

THE IMPORTANCE OF MEDICINES PRIMARY PACKAGING

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The primary packaging corresponds to container in direct contact with pharmaceutical form, produced in the context of the medicine or its repackaging.

These should have the following characteristics: physical strength, lightness, small volume possible and use of chemicals between container and contents should be almost nonexistent. There are many types of primary packaging, especially glass, plastics and metals. In pharmacies there are different types of primary packaging for dispensing in individual portion, they are packs, blisters and sachets.

All medicines must be identified on the immediate packaging with the DCI, pharmaceutical form, dosage, shelf life and batch.

Each primary drug repackaging operation should include its own batch number for use, which allows for concrete identification or data packaging batch, time and place of repackaging, as well as other relevant tracking and pharmacovigilance aspects.

Concluding, primary packaging is extremely important for the preservation of the medicines; it must ensure the stability of the pharmaceutical form and its active principle from the storage period until its use, protecting the medicinal product from external factors to which it is exposed (such as air, light and humidity). It is also indispensable in identifying the drug as it has essential information about it.

Keywords: Primary packaging, medications, blister, stability, identification

GENERIC VS BRAND-NAME DRUGS

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Brand-name drugs and generic drugs have the exact same bioequivalence shown in bioavailability studies. The brand-name drugs go through several clinical trials to prove that they have the therapeutically efficiency, safety and quality. These drugs have their own branding, trade name, and they are placed on the market with a patent protection that lasts, usually, for 20 years. A generic drug has the exact same active principle, in the same concentration, pharmaceutical form, administration method, dosage and the same therapeutically directions as the brand-name drug. The main difference between these two drugs is that when the patent protection in the brand-name drug expires, other laboratories are able to produce the generic drug with the base of the first one. The generic drug doesn't require research investments or clinical trials, making it preferable because it ensures the same quality and effectiveness for lower prices.

Keywords: Brand-name drugs; Generic drugs; Bioequivalence; Bioavailability

ROLE AND IMPORTANCE OF SECONDARY PACKAGING IN PHARMACY

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Secondary packaging of medicinal products, according to Ordinance n.º 455-A/2010 de 30 de June article 2º, subheading b) is the outer packaging in which the primary packaging is placed.

In this type of packaging a removable wrapping, container or any other form of packaging is required to protect, store and maintain a medicine in a secondary manner. It is essential that this package is attractive, instructive and enlightening in its pharmacovigilance and so that there is any kind of inconvenience in your application.

The materials chosen help the primary packaging to preserve chemical stability, resistance against degrading agents and environmental impact. The glass, metal, plastic, paper, cardboard, laminates and rubber-based compounds are examples of the types of materials used in the secondary packaging. They can also be made of aluminum, cellophane or plastic envelopes.

The secondary packaging as well as having a very important role in the conservation of the primary packaging, also has a crucial importance in information and rational administration of the respective drug.

Keywords: Secondary packaging; Drugs; Safety; Pharmacovigilance

TRADITIONAL HERBAL MEDICINES

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The use of medicinal plants is practiced since the beginnings of human civilization. In pre-history, man searched to relieve his pains or treat diseases through the action of the active principles existent in plants, although in a totally empirical or intuitive way based on random discoveries.

Plant based medicine means any medicine which has exclusively one or more active substances or plant-derived substances, one or more plant based preparations and one or more plant-derived substances in association with one or more plant based preparations.

Phytotherapies are free-selling medications, so they are directly linked to self-medication and to the guidance of the pharmacy professional. It is up to researchers and the scientific dissemination media to disclose the risks exposed to consumers who self-medicate with medicinal plants or phytotherapies, without the necessary knowledge for their rational use. For the safe use of these medicines long therapies should be avoided, since the use of natural medication does not mean absence of side effects or toxic effects.

Keywords: Traditional Herbal Medicines; security; self-medication; side effects.

IODINE DEFICIT: A PUBLIC HEALTH ISSUE IN PORTUGAL

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Introduction: Iodine is an essential mineral and cannot be body synthesized. Iodine should be intake regularly through diet.

Objective: Characterize iodine deficit in the Portuguese population, it's geographic distribution in Portugal and their associated pathologies, as well as identifying intervention strategies in the public health field to combat iodine deficit.

Methodology: Review of articles about iodine deficit written in English and/or portuguese was conducted. These articles were search in databases on the following platforms Google, Google Scholar and Scientific Electronic Library Online. Papers included was selected first by title and abstract analysis and after full reading.

Results: Studies shown that iodine deficit is higher in risk populations, particularly pregnant women, during breastfeeding and children. In the Autonomous Regions (Madeira and Azores) the levels of iodine in these risk groups are significantly lower than in mainland Portugal. It's deficit, although moderate, if manifested during pregnancy, can have serious consequences on children's cognitive neuro development, as well as causing various thyroid diseases. The general direction of health has started some efforts to address this lack of iodine in the population, especially at risk groups, such as iodized salt.

Conclusion: In Portugal, the available data on iodine deficit are still scarce but enough to raise concern as it points to widespread iodine deficiency throughout the country. Public health strategies must to be implemented to reverse the situation.

Keywords: Iodine Input; Iodine deficit; Thyroid; Public health

VITAMIN D DEFICIENCY, A PUBLIC HEALTH PROBLEM

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Introduction: The prevalence of vitamin D deficiency is currently perceived as a public health problem affecting several populations, therefore public health initiatives play a vital role on intervention.

Aims: To characterize vitamin D deficiency worldwide, understand vitamin D deficiency as a public health problem and to describe how food consumption through public health initiatives could contribute to solve the problem.

Methodology: Data collection was carried out through scientific databases Pubmed, Scielo, B-on and Science direct, using as research expression: “deficiency” AND “vitamin D” OR “calciferol” AND “public health” AND “nutrition”. The results, published in the last 10 years, were first analyzed by title, then abstract and finally full text reading.

Results: Vitamin D deficiency is evident not only in Western countries, but also in Asia and Middle East, age independently. In Europe 13.0% of individuals had low serum concentrations of vitamin D, being the deficiency more concerning during winter. Because of that it should be considered a public health problem requiring action in this view. Main causes for vitamin D deficiency are insufficient sun exposure and poor vitamin D diet. In Portugal the medium ingestion of this nutrient in every age group was inferior to the value considered adequate.

Conclusion: Attending vitamin D deficiency and low ingestion of this nutrient, improvement vitamin D through food consumption is needed. Supplementation for prevention and replacement of vitamin D to appropriate levels is still somewhat controversial. Public health initiatives focused on food intake and sun exposure could contribute to compliance the recommendations.

Keywords: calciferol, deficiency, vitamin D, public health, nutrition

CHILDHOOD OBESITY: AN ONGOING PUBLIC HEALTH PROBLEM

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Introduction: Obesity is present in 40% of the world population where it causes increased risk of lethal diseases and 13 types of cancer. With regard to public health, obesity is clearly a problem that increasingly the population and especially childhood obesity.

Objective: To understand obesity as a public health problem namely during childhood.

Methods: The research was carried out on PubMed, B-on and Science Direct using as key-words: "Obesity" OR "Overweight" AND "Public Health" AND "Child*" OR "Infant". The title was read and subsequently the abstract and the full text to choose the most relevant article. Research was restricted for articles from 2010 until today.

Results: In Portugal, the prevalence of overweight and obesity in children and adolescents are above 30%. Taking into account what was referred we can assume that childhood obesity is a problem of public health. Between determinants of childhood obesity environmental factors, physical activity and especially the knowledge parent's about healthy food choices were the important ones. Public health initiatives related to food intake adequacy could have a positive impact on problem solving.

Conclusions: Attending childhood obesity as a public health problem related to food consumption, there is necessary to have better food practice and healthy choices. The induction of public health policies specifically for long-term nutrition will promote an improvement in community welfare.

Keywords: "Obesity" OR "Overweight" AND "Public Health" AND "Child*" OR "Infant"

CARDIOVASCULAR DISEASES: PUBLIC HEALTH EMERGENCY

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Introduction: Over the years, cardiovascular diseases (CVDs) have been responsible not only for a high mortality but also for a high morbidity of the world population. Since there are several associated risk factors, most of them directly related to diet, it is imperative to understand the evolution of CVDs over the years and how the eating habits of the population have been influencing their incidence.

Aim: This review aims to understand whether CVDs are really a public health problem and how the adoption of a healthy diet like the Mediterranean diet can act as a prevention method.

Methodology: A literature review based in the keywords “Cardiovascular Diseases”, “Epidemiology”, “Mediterranean Diet” and “Prevention” was conducted using the scientific databases Google Scholar, Science Direct and PubMed, limiting our selection to 2000-2019 based on the title, the abstract analysis and the full reading of the article.

Results: Cardiovascular diseases remains the number one cause of mortality and morbidity in the world, with some impact on the economies of many countries. The Mediterranean diet has been the subject of several studies that have shown many benefits in preventing CVDs.

Conclusion: It is important to adopt innovative and more efficient strategies for cardiovascular diseases prevention and control, such as the implementation of community-based intervention programs and the implementation of health policies.

Keywords: Cardiovascular Diseases, Epidemiology, Mediterranean Diet, Prevention

HYPERTENSION AS A PUBLIC HEALTH PROBLEM: CAPE VERDE VS PORTUGAL

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Introduction: Hypertension is considered a public health problem with magnitude, risk and difficulty of control. There are two disparate realities, one from a developed country (Portugal), another from a developing country (Cape Verde), with different perspectives and totally different contexts.

Aim: To evaluate the impact of nutrition on a public health problem in Cape Verde, comparing with the Portuguese reality.

Methods: PubMed and ScienceDirect were databases selected to literature review, using as keywords: Hypertension; Cabo Verde; Portugal; Prevalence; Public Health. Papers were selected first by title and abstract and after full reading of the article. Twenty articles were selected. It was considered papers from last 10 years.

Results: Portuguese National Health Plan aims to decrease the prevalence of non-communicable chronic disease risk factors and increase the prevalence of lifestyle-related protective factors through an approach focused on primary prevention and health promotion. In Cape Verde, National Health Plan focuses mainly on food security problems, concern with populations at risk of insecurity.

In Portugal the goals are more advanced, being a developed country and with the role of recognized nutritionist; In Cape Verde, the concern is to guarantee the population continuous access to safe and nutritious food, focusing on the basic needs of the population.

Conclusion: Portugal and Cape Verde have been approaching and based on the knowledge of both health plans it is concluded that not only should the Portuguese National Health Plan be improved, but also should be an example for a still developing country, such as Cape Verde.

Keywords: Hypertension; Cabo Verde; Portugal; Prevalence; Public Health

EXCESSIVE SALT CONSUMPTION: IMPACT ON HEALTH AND PUBLIC HEALTH INTERVENTIONS

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Background: The excessive consumption of salt by the population is a danger to public health. It's urgent to propose measures for its reduction so that the population can have benefits at the level of cardiovascular diseases and in other prevalent chronic diseases, such as hypertension, which in 2012 had a prevalence of 42% in Portugal.

The WHO (World Health Organization) has set the objective of reducing the daily consumption of salt by 30% up to 2025. Therefore, the Integrated Strategy for the Promotion of Healthy Eating (EIPAS) was approved in Portugal, which aims to achieve that goal.

Aim: To understand how salt intake affects the population worldwide, based on the variables gender, age, food sources and subsequent comparison by region.

Methods: A literature review based in the keywords below was conducted, using the scientific databases Google Scholar and Science Direct, limiting our selection from 2014 to 2019. Paper were selected first by abstract and after by full text reading of the article.

Results: It was verified that the female gender had a bigger concern with salt consumption and that it increases with age. Regarding the variable food sources, cereals and fish represent a big part of the daily salt intake, but soups, ham, cheese and toasts have a role on it too.

Conclusion: Considering the WHO recommendation on salt consumption, it's crucial to intervene with consumers and industry to prevent diseases and to promote health

Keywords: Salt intake, Reduction, Health, Recommendations

ADDITIVES PRESENTS ON FOOD: IT'S IMPACT ON PUBLIC HEALTH

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Background: Additives are non-nutritive substances used to improve the appearance, taste, texture and shelf life, more used in food industry due to the high consume of processed food.

Aim: To understand how additives such as colorants, preservatives, antioxidants and flavorings can be a public health problem.

Methods: Literature consumption review of articles from the Google Scholar, PubMed, ScienceDirect and SciELO database was conducted using the key-words: "Chemical additives", "food additives", "additives and health risks" and "use of additives and diseases". Articles were selected first by title, followed by the abstract and, finally, by full text reading.

Results: Food additives intaked abuse upper limit can cause health damage. According that food companies/industries play a very important role on public health issue. This work aims to Additives may have a more concern substance especially in people more sensitive, such to this type of substances, which tend to develop diseases and/ or other complications.

Conclusion: There are necessary measures to reduce the consumption of additives and to create healthy eating habits so that major problems are avoided, taking into account the possible toxicological risks inherent to the frequent consumption of these substances.

Keywords: Chemical additives"; "food additives"; "additives and health risks"; "use of additives and diseases"

DYSLIPIDEMIA IN PUBLIC HEALTH

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Introduction: Dyslipidemia is characterized by alterations in the concentration of one or more lipids/lipoproteins present in the blood (triglycerides, cholesterol and high-and low-density lipoproteins [HDL and LDL respectively]). These alterations in the lipid profile are closely related to the development process of atherosclerosis.

Objective: To acquire a greater knowledge about dyslipidemia and also of one of its main consequences, atherosclerosis. Therefore, perceiving the impact of this on public health in general and the role of nutrition strategies on prevention and treatment.

Methodologies: The literature analyses was done using electronic data bases such as Google Academic and Pubmed. For a selection of more filtered articles, we focused on which were released less than 10 years ago and those that contained information about Portugal.

Results: The etiology of dyslipidemias could be genetic or caused by other diseases, use of medications and inadequate life habits. Habits such as consumption of foods rich in saturated fats and the absence of regular physical exercise, which can lead to pathologies such as atherosclerosis. This consists on the accumulation of fat in the walls of the arteries, making it solid and forming plaques that prevent the passage of blood and consecutive irrigation of the heart and brain.

Conclusion: It is the function of the nutritionist to guide the change in the lifestyle of the patient with dyslipidemia, and should instill healthy and balanced eating habits as a diet low in saturated fat, accompanied by regular exercise. If this does not happen, the risk of obtaining cardiovascular diseases is increased, thereby increasing morbidity in the Portuguese population.

Keywords: Keywords: Dyslipidemia, cholesterol, atherosclerosis

IRON DEFICIENCY ANAEMIA: PUBLIC HEALTH INTERVENTIONS FOR THE PREVENTION AND TREATMENT

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Introduction: Iron is a mineral essential to the body and found in great abundance in the blood. Both the absence of iron as dysfunction causes exaggeration of the body. There are two types of dietary iron, heme iron in animal sources, iron and non-heme present in plant sources. To increase body stores of iron suggested that the increase in heme iron intake and increased consumption of vitamin C, since it is one of the main stimulators of iron absorption.

Aim: This study aims to deepen knowledge of anaemia by iron deficiency, taking into account which public health interventions could be implemented for the prevention and treatment as well as the methods most appropriate to supplementation.

Methods: A literature review was conducted based on scientific articles and platforms, such as PubMed and Science Direct, using as research expression "iron deficiency anaemia". The selection of articles was made based on the year of publication and we only analyzed articles from 2007 to 2017.

Results: According to estimates of the World Health Organization (WHO), anemia affects about 40% of the population, and at least half of the global prevalence can be attributed to iron deficiency. Public health interventions, shown very good results in prevention and treatment of iron deficiency.

Conclusion: Iron deficiency is classified as a nutritional disorders, most prevalent in worldwide. Anemia can also be a consequence of an unbalanced, low-iron diet, so that a balanced and varied diet is crucial for this imbalance doesn't happen. Food of animal origin such as viscera and red meats, are rich in iron, such as some foods of plant origin like beans, lentils, peas and grain so their consumption and introduction into the diet is important to keep you from a healthy life.

Keywords: Anaemia, iron, nutritional intervention, eating habits.

DYSLIPIDEMIA AS A PUBLIC HEALTH PROBLEM

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Introduction: Cardiovascular Diseases (CVDs) have been characterized as a worldwide public health problem, being responsible for most of casualties. It has several risk factors, such as dyslipidemias, which are qualitative and/ or quantitative changes in lipids blood levels.

Objective: The aim of this study was to understand the influence of dyslipidemia on public health. Therefore, also understand the epidemiological characteristics of this disease and the influence of nutrition on its prevention.

Methods: A literature review based in the key-words dyslipidemia, lipid profile, hypercholesterolemia was conducted using the Google Scholar, Scielo, Science direct and PubMed search databases limiting our selection from 2009 to 2019 based on the title, the abstract analysis and full reading of the article.

Results: According to WHO data, CVDs accounted for about 17.9 million deaths worldwide (represents the main cause of death). Being a risk factor of CVDs, dyslipidemia has a big influence on these data. The prevalence of dyslipidemia in the population was 59.74% and the low levels of HDL cholesterol is the most common type of dyslipidemia. Unbalanced eating habits were the behavioral risk factor that most contributed to CVDs mortality and dyslipidemia the second risk factor, proving to be a serious public health problem.

Conclusion: Nutritional recommendations and the adoption of a healthy lifestyle are indispensable for fighting this public health problem.

Keywords: dyslipidemia, lipid profile, hypercholesterolemia

CHILD MALNUTRITION: A CONCERNING PUBLIC HEALTH ISSUE

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Background: Public health is defined as one of the efforts organized by society to protect, promote and restore the health of populations. Child malnutrition, a multifactorial clinical-social nature whose roots are in poverty, is thus considered a public health problem.

Aim: to understand the association of a public health problem with nutrition, that means, to explore its etiology, the impact on the world's population and others.

Methods : articles found in Scielo database and documents from "DGS" and "OMS" was reviewed, essentially looking for keywords such as: child malnutrition, growth.

Results: Childhood malnutrition is associated with the death of 56% of children under 5 years of age in developing countries.. Risk factors include family problems related to the socio-economic situation and poor knowledge of mothers about health care with the child. Prevention and control of malnutrition depend on broader and more efficient measures to combat poverty and hunger and social inclusion policies. This level of action, although more general, can be defined as the basis of prevention since it goes to the root of the problem and allows a decrease in the prevalence and mortality rate. However, it is the responsibility of health professionals to care for the child with malnutrition according to the current scientific knowledge available and the effective action. "

Conclusion: During this phase of life there is a great physical and cognitive development, a nutrition adequate to needs, complemented with medical intervention if necessary, is the key to the good path.

Keywords: child malnutrition; growth; nutritional deficit ;caloric deficit.

TRANS FATTY ACIDS AND ITS IMPACT ON HEALTH

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Background: Trans fatty acids are uncommon in nature, formed during the partial hydrogenation process in which vegetable oils are converted in margarine and vegetable fats for use in the food industry.

Aim: To investigate the impact of Trans fatty acids consumption on health, the population of the risks and understand how public health initiatives could contribute to combat their ingestion.

Methods: Literature review was conducted using the expressions Fatty Acids, Fatty Acids Diseases, Policies, Health and the academic Google, Pubmed, Scielo to do the research. The choice of articles was due to the scientific validation, the relationship with the theme and the information provided.

Results: There are no nutritional benefits in trans fat consumption, which have a direct relationship to the development of innumerable diseases, at both physical and psychological level. Public health initiatives have been shown to be effective in reducing the intake and consequently the effects caused by trans fatty acids consumption .

Conclusion: In spite of the role of public health initiatives, there is now supported scientific evidence that trans fatty acids are becoming a global health problem, therefore is necessary to increase information and reinforce education to modify current nutritional habits.

Keywords: Fatty Acids, Fatty Acids Diseases, Policies, Health

THE HOSPITAL PHARMACY TRENDS

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Introduction: Over the years, healthcare professionals have seen major changes in the pharmaceutical world, as there is a constant development of drug distribution and the therapies used in various pathologies, in order to avoid medication errors.

Objective: The purpose of our work is to see the scientific evolution over the years and what is the prospect of future development.

Methods: The scientific review was based on articles published in scientific databases. Fourteen articles published between 1983-2019 were chosen but only four were selected. The keywords used: "New hospital trends"; "Past, present and future of pharmacy hospital" and "Pharmacy hospital in Portugal".

Results: After collecting all relevant information from the articles it was verified an evolution of organic products since 2003. A unit dose distribution, mainly for solid and low-volume injectable preparations in two small hospitals in the Lisbon region. A change in the distribution system, as well as other clinical pharmacy activities supported by the active management of regional hospitals. A new system being set up at Lisbon Military Hospital based on individual distribution providing information on medicines, parenteral nutrition, intravenous mixtures and pharmacokinetics and the treatment of patients of Lisbon Hospitals has been supported by the Hospital da Marinha laboratory for the testing of certain medicines.

Conclusion: We conclude that in the various existing therapies there has been a constant evolution, as there will be in the future, because there are unanswered questions at the therapeutic level that need to be answered so that people's quality of life can be better.

Keywords: "New hospital trends"; "Past, present and future of pharmacy hospital" and "Pharmacy hospital in Portugal"

KAIZEN LEAN: A HOSPITAL PHARMACY MANAGEMENT METHODOLOGY

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Introduction: KAIZEN is a word of Japanese origin consisting of 2 words: “KAI” – change and “ZEN” – better, which means change for the better or continuous improvement so that this practice is a constant within organizations.

KAIZEN LEAN is an organization management methodology that aims to reduce costs and times, eliminate waste and optimize resources and equipment that leads to increased productivity and quality of the company and the working conditions and well-being of its workers.

Objective: Analyze if Kaizen is an advantageous tool in hospital pharmacy management.

Material & Methods: This is a bibliographic review and were selected articles with publication year equal to or less than 10 years. With the keywords: “Kaizen”, “quality improvement”; “management”, “productivity” AND “hospital pharmacy”, we found 11 articles, of which we selected only 5. Results: Kaizen is based on 5 principles of continuous improvement and is performed by 5 steps considered 5 S's steps of eliminating waste and increasing productivity. In the articles reviewed based on the hospital pharmacy, it has been found that the Kaizen Lean methodology has greatly improved employee productivity, reduced waste, reduced costs and times, increased profitability and patient safety. Employees are the most important link in change, so everyone has to be involved in the continuous improvement that needs to be done every day and in every area. Conclusion: The Kaizen philosophy is a fundamental tool in healthcare and Pharmacy where one should not lower the quality of the product or service provided but make significant financial and organizational gains by eliminating waste and creating flows.

Keywords: Kaizen Lean, hospital pharmacy, management, quality of service, continuous improvement.

THE COST OF PATIENT IN HOSPITAL

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Introduction – Health economics plays an important role worldwide. The limited resources used to provide services and the increase on health needs justify the interest in economy. On this way, it becomes essential to evaluate the costs of patients in the hospital context, in order to reduce their costs but in the quality of health services provided in future.

Aim – The goal is estimate and compare the costs of hospital patients in Portugal and other advanced countries.

Materials and methods – The research was based on 3 scientific articles selected from different databases like Pubmed, Science Direct and Google Scholar. Data were collected from 2015 until this year and with keywords: “Hospital costs” and “Patients” and “Portugal”.

Results – The increasing of the costs with health care is a trend explained by factors like population increase, technological complexity, epidemiological profile's changes helped by the emergence of new diseases and increase in chronic degenerative diseases. Knowledge of costs is becoming a key step in hospital management, which is embedded in a context of high costs, scarce resources, quality pressure and good services. The resources considered on the cost evaluation are: hospitalization, medical appointments, laboratory tests, imaging tests, radiotherapy, radiosurgery, concomitant medications, etc. The National Health Service (NHS) price lists, published in the oficial journal, show the amounts assessed by each patient in different sectors of the hospital.

Conclusion – We conclude that patients' needs are exceeding the resources available in hospitals. The rising costs of patients in the hospital context represent an increasingly worrying situation. This is imperative to implement strategies that can reduce them without compromising the quality of services provided to hospitals.

Keywords: hospital, costs, pacient

MEDICATION ERRORS

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Introduction: Although the drugs are fundamental to patient's care, the use of them is associated to the occurrence medication's errors and adverse effects that may cause morbidity and mortality, both notorious.

The medication's error is defined like any avoidable event that conduct to incorrect use of medication or patient's damage. It happens when the medication is on consumer and health professionals control and therefore during any step of the medication process, since the prescription, transcription, distribution, administration and monitoring.

Objective: The objective is to clarify the different factors that can lead to medication errors, the preventive measures and the classification of the various medication errors.

Methods: We realized a search between 2013 until today, in the scientific databases: Pubmed, ScienceDirect, Medline e Scholar Google and we selected 29 articles. After the analysis of the selected articles were excluded those were less suggestive and those who were far from our reality. This way, we have collected only 7 articles to our theme.

Results: According to the research carried out, the medication errors may be classified as prescription errors, delivery, inappropriate dose, incorrect medication's preparation, administration and monitoring. In addition, they can also be classified according to their severity as category A to I errors. Category A errors are characterized as a non-real error and category I errors are identified as errors that cause the patient's death.

However a variety of strategies are applied attending to try to reduce the occurrence of medication errors such as system implementation computerized physician order entry, barcode placement, interventions by pharmacists, kardex utilization, among others.

Conclusion: We concluded that there are several factors that lead to medication errors, however, several strategies are applied to ensure a better health service.

Keywords: Medication errors, Patients safety and Drug therapy

PHARMACY QUALITY SERVICES

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Introduction: Nowadays, pharmaceutical services play a key role for health, whether at community pharmacy, hospital or any other service that involve them. It is important to implement measures to improve the quality of pharmaceutical services by providing the best care for users. One of the principals ares on hospital pharmacy is unit citotoxic manipulation, addressing topics such as technology innovation for cytotoxic manipulation and reduction of medication errors providing safe and quality therapy to the patient.

AIM: Determine which preventive mensures increase the quality of pharmaceutical service in reducing of errors the cytotoxic manipulation.

Material & Methods: The researched articles were based on the electronic databases like Google scholar and the Pubmed. The research was conducted with the keywords: "Pharmacy quality services" and "hospital"; "Pharmacy Services" and "Cytotoxics"; "Pharmacy quality services" and "medication errors", between 2004-2019 of which we selected 6.

Results & Discussion: Medication errors may be clinically significant or clinically non-significant. To reduce these types of errors it's important to improve the distribution system of pharmacies, creating an individualized system of dispensing drugs, intensify the verification of prescriptions, using, for example, a computerized prescription and also implement strategies to communicate adequately with patients.

One way to reduce errors in cytotoxic preparation is the implementation of a robot to able of cytotoxic preparation improves the quality of handling, identifying preparation errors and preventing manipulations from reaching the user in poor condition. It also promotes process safety by reducing pharmacy technician exposure to cytotoxic products.

Conclusion: The technological advancement is a measure that contributes greatly to the increase of the quality of pharmaceutical services but it's necessary to have a good qualification of human resources.

Keywords: Manipulation, medication errors, cytotoxic

ECONOMIC MANAGEMENT OF DRUG STOCKS IN HOSPITAL PHARMACY

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Introduction: The stock corresponds to the "set of units of each article that constitutes a certain reserve waiting to satisfy a future need for consumption".

The economic management of stocks is defined as a set of operations that allows, after the evolution of the records of stock values that have been verified in the hospital, to make decisions on how much and when to order for the purpose of achieving the best quality of service at a minimum cost, avoiding the lack of materials. In addition, the management of stocks also includes administrative management, physical management (location and deployment of warehouses) and inventories.

There some methods related to the management of stocks that provide the professionals a better and easier way to control, not only the stock, but also the investments. Such as the ABC and the VED analysis.

Objective: This work aims to analyse and evaluate the stock management in a hospital pharmacy context.

Methods: For this review, databases such as "PubMed" and "Google Scholar" were consulted. We selected about 1 article (2016), 1 dissertation (2013) and 6 websites.

Results: It becomes fundamental to develop safety policies and methods related to the management of hospital stocks, in order to prevent possible lacks, improve the work of professionals and increase the efficiency of the hospital pharmacy. Like, identify and remove all the products that expired or that are not suitable to administrate to the patient, and classify them in several categories as vital, essential and desirable (VED analysis) and Always, Better Control (ABC analysis).

Conclusion: The management of hospital pharmacy stocks is essential, has singular methods and plays an important role when it comes to minimize costs and improve the efficacy of the pharmaceutical services. Consequently, the satisfaction of the patient improves.

Keywords: Management, hospital pharmacy, stocks

IV ADMIXTURE/ THERAPEUTICS PARENTERAL NUTRITION SERVICE

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Introduction: Parenteral nutrition (PN) is a therapeutic mixture of solutions that include dextrose, amino acids, electrolytes, vitamins, minerals, trace elements, and lipid emulsions. The formulation is delivered via a catheter device placed directly into the venous system of patients with intestinal failure, who are malnutrition and cannot tolerate oral or enteral nutrition (EN).

Objective: The aim of this study is to do a characterization of the parenteral nutrition service.

Methods: A scientific review was conducted through research databases "PubMed", "Google Scholar" and "ScienceDirect" using the keywords "parenteral service" AND "IV admixture" AND "nutrition". 7 articles were selected between 2010 and 2019.

Results: Nutrition support team (NST) is an interdisciplinary team often composed of physicians, dieticians, pharmacists, and nurses who have specialty training in nutrition support with the responsibility to manage PN therapy following carefully designed protocols.

The pharmacists and pharmacy technicians involved in PN preparation have a significant role to play in ensuring safe and appropriate use, including the assessment of patients' nutritional needs; developing and implementing of an individualized nutrition care plan and monitoring patients' response to PN therapy.

It is important for the nutritional practice and research communities to reach consensus on the terminology and criteria to be used for nutritional disorders as well as for core nutritional procedures such as screening, assessment, treatment and monitoring. A unification of the appropriate terminology would enhance the legitimacy, credibility and comparability of nutritional practices.

Conclusion: In conclusion the parenteral nutrition service is compound by an interdisciplinary specialized team that's responsible for managing PN therapy. Consensual terminology and practices also play an important role in this service because it decreases the errors made in PN preparation.

Keywords: parenteral service, IV admixture, nutrition

COMPOUNDING DRUGS IN HOSPITAL PHARMACY

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Introduction: The pharmaceutical industry is largely responsible for the manufacture of medicines. However, it is limited in dosage forms for medical areas such as paediatrics, geriatrics, dermatology and others. Manipulated drugs are the best solution because they allow a customization to meet specific needs. Some examples of manipulated drugs are combined products of natural and allergenic hormones, cytotoxics and antibiotics. Antibiotic preparation and administration quality depend on preparation modalities and stability parameters. These sources of information are indeed lacking or are often incomplete and/or difficult to access.

Objective: Understanding and clarifying guidelines regarding the preparation and administration of injectable antibiotics in a hospital.

Methods: A literature review was conducted through research databases "PubMed" and "Google Scholar" using the keywords "manipulated drugs" AND "Antibiotics" AND "Guidelines". We selected about 3 articles between 2013 and 2019.

Results: The guidelines for preparing and administering injectable antibiotics, aiming to improve their safety and quality in patient treatment. Some of these measures are based on understanding the correlation between the pharmacokinetics and pharmacodynamics; on bettering the parenteral administration of the drug in ambulatory; on knowing the different infusion devices; on computerizing prescriptions and on knowing the factors that can influence the drug's stability such as: concentration, pH, temperature, lighting and interactions between the drug and the material of the package.

Conclusion: We concluded that guidelines are essential to improve and ensure the quality of patient treatment. It is, therefore, necessary to establish and implement guidelines for the preparation and administration of antibiotics, which are key to improving efficacy and decreasing antibiotic resistance. Compliance with these guidelines is crucial so that patient's safety is not compromised.

Keywords: Antibiotics, Guidelines, Manipulated Drugs.

NEW TECHNOLOGIES IN THE PHARMACY MANAGEMENT: AUTOMATION

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New Technologies play an important role in reducing risks for hospitalized patients. They allow error detection and strategy implementation that is able to reduce error rates while ensuring safe use of medicines in a population. New computer systems and programs applied to the health field are presented today as one of the main strategies for reducing drug errors. More generally, research is needed on specific workplace practices and ways of working organization, that can support collaborative innovation in different public services contexts.

The aim is study the new technologies in the pharmacy management and its automation.

For this review, were consulted databases such as PubMed and Google Scholar, where we found five articles, of which we used two from 2016 and 2017.

It was noted that the use of robotics to redesign pharmacy services may have been framed by a number of reform policies and agendas.

Is clear is that the program has generated major and innovative changes in how services were delivered, and work was organized. Patients and concerned parties produced completely new operational forms built around substantial investment in cutting-edge technologies; and involved creating new tasks and ways of working.

At this stage, a tool that proved itself to improve safety in hospitals has been the radio or barcode systems for patients. It allows identification, verification and recording of drug dosage to be administered like smart infusion pumps connected to a drug library, this way preventing many errors described as wrong patient or wrong dose.

The new technologies applied to the use of medicines in hospitals have been proven effective for hospitalized patients safety. Thus, it is necessary to creation of new organizational forms, the introduction of new management methods and techniques and working methods.

Keywords: New Technologies, pharmacy management, risk reduction, error detection and medication errors

JAPANESE ENCEPHALITIS VÍRUS (JEV)

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Japanese Encephalitis Virus (JEV) is the most important cause of viral encephalitis in Asia, being a positive strand RNA virus that belongs to the family Flaviviridae of genus Flavivirus. Japanese encephalitis (JE) is primarily a disease of children since adults have acquired immunity through previous exposure.

The major amplification host are pigs, whereas birds act as carriers and *Culex* species mosquitoes are the vector. Humans are accidental hosts and get infected through mosquito bite but cannot sustain high virus titer for further transmission.

From the initial exposure until the appearance of the first symptom, there is an incubation period of 5-15 days. Most of the JEV infections are asymptomatic with less than 1% of the population developing the disease. The symptoms include high fever, seizures, and increasing loss of consciousness.

The World Health Organization recommends testing for JEV-specific IgM antibody in a single sample of cerebrospinal fluid (CSF) or serum, using an IgM-capture ELISA. To reduce false-positive rates from previous infection or vaccination, the CSF sample is the one we opt for.

Since there is no antiviral treatment for patients with JE, the treatment acts exclusively as a supportive mean to relieve symptoms and stabilize the patient. Based on the mode of transmission, the prevention of JEV is based essentially on 4 strategies, such as, mosquito control, avoiding mosquito bites, pig immunization and human immunization.

All things considered, human immunization is the active method of choice to achieve long-term sustainable protection against JE.

Keywords: JEV; RNA; Flaviviridae; Japanese encephalitis

WEST NILE VIRUS

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West Nile Virus (WNV) belongs to the family Flaviviridae, genus Flavivirus, being a small enveloped virus, about 50 nm in diameter. The genomic RNA is enclosed within a nucleocapsid. Is a mosquito-borne virus, neurotropic human pathogen that causes WNV fever and the infection severe form is encephalitis.

The Culex mosquitoes transmit the virus, through enzootic cycle between them and birds, being the primary host, humans, horses, and other mammals can also be infected.

About 1 in 5 people who are infected, develop febrile illness and other symptoms although only 1 out of 150 infected people develops a serious and sometimes fatal disease.

The primary tools used to diagnose WNV infection consists of serological tests for specific IgM antibodies (Ab) against WNV, detected in serum or cerebrospinal fluid. These Ab are detected, one to several days after the onset of symptoms, either by enzyme-linked immunosorbent assay or by hemagglutination inhibition methods. However, seropositivity has to be interpreted with caution due to the frequent cross-reactivity with infection caused by other flaviviruses. In this cases IgG detection by an avidity assay can be useful to sort out recent from prior infection.

Besides these tests, there are others essential for diagnoses, such as PCR and immunohistochemistry.

Currently, there are no vaccines to prevent, or medications to treat WNV in people.

Prevention and control can be made by avoiding exposure to mosquitoes by using insect repellent, wearing clothes that cover the majority of the body or by systematic screening of blood donors for WNV infection.

Keywords: West Nile virus, mosquitoes, RNA, Flaviviridae, encephalitis

SCREENING: IN THE BLOOD – DENGUE FEVER VIRUS

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Dengue virus (DENV) is an RNA virus and an acute arthropod (arboviruses) viral infection of the Flavivirus genus and Flaviviridae family. The incidence of dengue has grown dramatically in recent decades and it's mostly transmitted by female mosquitoes of the genus *Aedes aegypti* found mainly in tropical and subtropical areas. The first identified in Portugal was the *Aedes Albopictus* in 2012 and his infection was manifested after a period of 3 to 14 days with symptoms like high fever with a severe headache.

As a precaution, it has been recommended that people should wait 4 weeks to donate blood if they have traveled to areas with a high or moderate risk of transmitting the virus.

About the structure and specification of the virus, the mature virion consists of three structural and seven non-structural proteins and there are known four serotypes that cause dengue, according to biological and immunological criteria: DEN-1, DEN-2, DEN-3, and DEN-4. The envelope protein is involved in the main biological functions of the virus and it binds to receptors on host cells, allowing the virus to be transported through it.

The infection causes flu-like illness (and occasionally severe dengue), but knowing that there is no specific treatment for dengue, early detection and access to proper medical care lowers fatality rates below 1%. Serological diagnosis methods of dengue infections include ELISA and complement fixation tests. Dengue antibodies specific IgM and IgG ELISA are widely used, being relatively inexpensive, with good sensitivity, quick and simple to perform.

Keywords: Dengue, vírus, *Aedes*, ELISA, Flavivirus, vaccine, DENV

YELLOW FEVER

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Yellow fever is a disease caused by an enveloped virus (Flavivirus) with a single-stranded RNA genome that encodes three structural proteins (Capside, pM, E) and seven non-structural proteins.

It is transmitted to humans through the bites of infected aedes and haemogogus mosquitoes who acquire the virus by feeding on infected primates. Transmission might also occur through blood transfusion, therefore donors from endemic areas should be tested.

The disease is diagnosed by travel history to an endemic area (Africa and South America), exposure to infected mosquitoes, vaccination history, symptomatology and laboratory tests through virological and/or serological methods such as PCR (to quantify viremia) and ELISA (to detect anti-YFV IgM and IgG), respectively.

Following an incubation period that may last from 3-6 days, symptoms like fever, chills, muscle pain and headaches may appear. In most cases, patients experience a full recovery, although they may suffer a secondary phase of infection characterized by severe hemorrhage, disseminated intravascular coagulation (DIC), renal and liver disease (the term 'yellow fever' alludes to associated jaundice). In 50 to 80% of cases, what follows is delirium, seizures and coma, culminating in death.

There is no effective treatment, thus the main focus becomes prevention through vaccination of individuals travelling or residing in endemic areas, which confers lifelong immunity.

Keywords: Yellow Fever, Aedes aegypti, vaccination, Flavivirus

ROSS RIVER VIRUS

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Ross River Virus (RRV) is an arthritogenic alphavirus that is responsible for a type of non-lethal but debilitating disease. It can cause outbreaks of debilitating musculoskeletal inflammatory disease in humans. The first well-described outbreak occurred in 1928 and, during World War II there were more outbreaks, and the name epidemic polyarthritis was applied.

In Australia, RRVD is the most frequent disease transmitted by mosquito. The outbreaks normally occur during tropical season, such as warm and wet conditions. Patients typically with myalgia, fever, maculopapular rash (erythematous or red) and also polyarthralgia.

In the laboratory, it is important to diagnose the disease so that we could proceed as quickly as possible for treatment. Virus isolation from humans is rarely achieved, probably because RRV does not persist beyond the early stages of disease. The detection of IgM in an acute-phase specimen provides a presumptive diagnosis of recent infection. Actually, we know that also one specimen isn't enough to give a reliable diagnosis, for that reason, we need to compare two specimens obtained with 10 to 14 days apart.

There aren't antiviral therapies or vaccines for this disease and, normally, the follow up is also palliative. However, the pathogenesis of RRVD has been studied and, recently, established murine models of RRVD, able to precisely replicate human disease.

Keywords: Ross River Virus; RRVD; epidemic polyarthritis

RIFT VALLEY FEVER VÍRUS

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Rift Valley fever Virus (RVFV) was discovered in 1931 and is an emerging pathogen of major concern throughout Africa and the Arabian Peninsula, affecting both livestock and humans raising apprehensions that it could emerge in other parts of the globe.

This virus is an enveloped, segmented and is a negative-stranded RNA virus carrying a tripartite RNA genome that belongs to Bunyaviridae family. It's transmitted by mosquitoes and causes huge outbreaks amongst ruminants and humans.

Incubation period ranges from two to six days which in most cases are a mild form of the disease (nonspecific treatment is required for these patients). Although, a small ratio of patients develops a much more severe form.

Typically, they develop an acute febrile illness, followed by a fatal hemorrhagic fever, encephalitis or ocular diseases. In ruminants some of them experience miscarriage during the outbreak. The symptoms are not very specific therefore it's difficult the clinical diagnosis. So, the role of laboratory test to detect the virus is very imperative.

However there's no approved vaccine there's new perceptions to improve them. Is important to highlight that the prevention is the early detection of cases in animals in order to avoid the spread of the disease.

Consequently, the main goal is to describe how the viral replication cycle works, the role of viral gene products in human system, the tools to diagnostic RVF in laboratory sciences and the new insights for development of vaccines.

Keywords: Rift Valley fever virus; zoonoses; laboratorial diagnostic; vaccines.

CHIKUNGUNYA VIRUS (CHIKV)

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Chikungunya virus (CHIKV) is a single-stranded RNA enveloped virus belonging to the Togaviridae family. It can be transmitted through the *Aedes albopictus* and *Aedes aegypti* mosquitoes and from mother to child during birth. Theoretically, it can also spread through blood transfusions, although no known cases until today have been recorded. The infection symptoms caused by CHIKV include fever, arthralgia and encephalitis.

The virus was first identified in the Caribbean, in late 2013, but was described as early as 1952, in Tanzania. Outbreaks of CHIKV have occurred in Africa, Asia, Europe and in countries in the Indian and Pacific Oceans. Its incubation can take up to twelve days, and symptoms only manifest after that time, if ever - since it can also be asymptomatic (3% to 28%).

Chikungunya disease can be diagnosed through serological testing, like ELISA, which detects both IgM and IgG anti-Chikungunya antibodies (Ab). IgM Ab is at its highest levels around 3 to 5 weeks after contracting the disease. The reverse transcription-polymerase chain reaction technique can also be used to detect and genotype the virus, since it can be isolated from blood in the first days after infection.

There is currently no vaccine or cure for the infection. CHIKV is often debilitating and has a low fatality rate but can have considerable implications due to acute and chronic disabilities, severely reducing quality of life for infected patients.

Keywords: Chikungunya virus; *Aedes aegyptus*; *Aedes albopictus*; ELISA; RNA enveloped virus

THE PINEAL GLAND

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The pineal gland also recognized as conarium gland is a small endocrine gland located in the posterior portion of the third ventricle.

It has a pine cone shape between red and grey colours and its size resembles a pee grain covered by the pineal capsule.

Its primary function is to produce and release melatonin; the hormone that helps to modulate sleep patterns. It means that this photosensitivity gland inhibits melatonin production during the day and promotes it during the night. This complex neural pathway that involves retinal ganglion cells, connect pinealocytes and utilizes the optic nerve to produce synapses with the upper cervical ganglion reaching the pineal gland and creating this specific reactions.

Some studies suggest that this gland influences the pituitary glands secretion of the sex hormones and the regulation of bone metabolism.

When produced in high levels it can lead to low blood pressure, adrenal and thyroid glandule dysfunction.

In case of the opposite (low levels of melatonin), it can originate insomnias, anxiety, hypothyroidism, menopause symptoms and bowels hyperactivity.

The tumours that affect this gland can lead to a premature or late puberty.

Keywords: Pineal and endocrine gland; melatonin; diencephalon; photosensitivity.

CHRONIC PAIN

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Pain represents the way the body reacts by alerting itself when something is wrong. Chronic pain is different in that, it lasts weeks, months or even years after the injury.

In Portugal it is estimated that 3 million individuals suffer from chronic pain, whose prevalence is approximately 36%.

Doctors define this pain as a disease that lasts between 3 to 6 months. The pain is defined this way when it exceeds the estimated period of a normal recovery.

Chronic pain repeatedly stimulates nerve fibres and cells that detect, send, and receive pain signals. This repeated stimulation can physically alert the fibres and nerve cells or make them more active, therefore elevating the transmission of pain to the spinal cord and brain. Thus, in chronic pain, the painful stimulus will always be superior to the inhibitory stimulus, hence the brutal pain that is experienced.

In general, chronic pain may result from nociceptive stimulation, nervous system damage and / or psychological pathology such as neuropathic pain, fibromyalgia and ghost pain.

This disease causes morbidity, absenteeism and temporary or permanent disability, causing high costs to health systems, with a greater impact on the quality of life of patients and their families.

This pain can be alleviated but for this to occur it is necessary to, for example, have a follow up of physiotherapy, acupuncture, hypnosis, and many more, as well as taking the required medication.

Keywords: chronic pain, ghost pain, causes, disease

NEURODEGENERATIVE DISEASES: PARKINSON AND ALZHEIMER

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Neurodegenerative diseases are a group of chronic, progressive disorders characterized by the gradual loss of neurons in some areas of the central and peripheral nervous systems. Some of these cause deteriorations of memory, cognition and others affect the ability to speak, to move and to breath. Alzheimer and Parkinson are the most common neurodegenerative diseases.

Now are known three types of genes responsible for the Alzheimer disease. Specifically, the soluble amyloid precursor protein (APP) gene is responsible for the accumulation of β -amyloid in the brain, that leads to the formation of amyloid plaques and induces the neuronal abnormalities that underlie dementia. The presenilin 1 and 2 are associated to the transmission of the disease to the next generations, the ApoE4 is involved in APP metabolism. Also tau proteins perform the function of stabilizing microtubules. When these become defective and fail to stabilize, Alzheimer's develops.

Secondly, the main symptoms of Parkinson are problems of movement like the death of dopaminergic neurons in the substantia nigra. It's a region within the brain that release a substance called dopamine. By releasing dopamine, the neurons of the substantia nigra communicate with movement producing parts of the brain. Neuronal death in the substantia nigra means that these groups of neurons can't work properly, causing stumbling and shaking in those that are affected.

Physical therapy has an important role in improving quality of life, allows greater independence of the patient as it improves motor skills, like loss of muscle strength and balance, but also psychic abilities.

Keywords: neurodegenerative, Parkinson, Alzheimer

HORMONES OF THE MUSCLE AND BONE: OSTEOCALCIN AND MYOKINES

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Hormones of the muscle and bone: Osteocalcin and Myokines

In addition to classic endocrine tissues, the muscle and bone also produce hormones, osteocalcin and myokine.

Osteocalcin is a non-collagenous protein synthesized by mature osteoblasts. The synthesized protein endures post-translational modifications leading to the formation of decarboxylated osteocalcin, which is sent to the bloodstream, and of carboxylated osteocalcin that is introduced into the bone matrix. The vitamin K1 is an essential cofactor for such process that will allow mineralization of the deposited matrix. The action of this protein on the muscles happens mainly during physical activity, as it helps the muscle fibres in the capture of glucose and fatty acids. It also increases insulin sensitivity, reduces triglyceride levels and consequently decreases visceral fat in the body. This protein also plays an important role in the male fertility.

Myokines are cytokines or other proteins that are produced, expressed and released by muscle fibres during muscular contraction.

They have autocrine, paracrine and endocrine effects and include factors such as IL-6, IL-8, BDNF, Irisin and Myonectin.

Physical exercise reduces the possibility of having many diseases because it foment the anti-inflammatory effect. Muscular contraction instigates the production of myokines which decrease inflammation levels.

The brain has many myokines receptors, which explains the fact that less active people are usually predisposed to neurodegenerative diseases and risk of depression.

The non-existence of myokines is one of the main causes of obesity, cardiovascular diseases, type 2 diabetes, insulin, among others. In conclusion, myokines are involved in the improvement of metabolic processes increasing our immunological capacity.

Keywords: osteocalcin, myokines

ELECTROCARDIOGRAM AND IF CURRENT

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The heart muscle can contract rhythmically due to various mechanisms that spontaneously command and generate these contractions.

A key role in the generation of diastolic depolarization is played by the funny current (If). The If current, originally described in sinoatrial node (SAN) myocytes or pacemaker cells as an internal hyperpolarization-activated current to the diastolic range of stresses, has properties suitable for generating repetitive activity and modulating the spontaneous rate. These properties include mixed sodium and potassium ion permeability, hyperpolarization activation and slow activation and deactivation kinetics.

The degree of activation of the funny current determines, at the end of an action potential, the steepness of phase IV depolarization; hence, the frequency of action firing.

Heartbeat abnormalities are detected by diagnostic methods such as the electrocardiogram.

An electrocardiogram (ECG) is a measure of how the heart's electrical activity changes over time as action potentials propagate throughout the heart during each cardiac cycle. Each heart cell creates a small electric field when it contracts, where the sum of all these electrical signals creates the signal known as the ECG. The graph obtained with the aid of an electrocardiograph consists of a series of waves, identified as P, Q, R, S and T, which corresponds to an event or group of events. P wave corresponds to atrial depolarization (atrial contraction occurs); The QRS complex represents ventricular depolarization, that is, it marks the beginning of ventricular contraction and, finally, the T wave indicates ventricular repolarization, ending the cardiac cycle.

Keywords: funny current, electrocardiogram, cardiac cycle

PHYSIOLOGY OF BONE REABSORPTION AND BONE CELLS

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Bones can be classified into long, flat, short and irregular bones. Long bones have one diaphysis and two epiphyses, flat bones have, on the inside, cancellous bone between two layers of compact bone. The short bones are almost cubic or round and the irregular bones do not have a characteristic shape.

The bone consists of bone matrix and bone cells (osteoclasts, osteoblasts, osteocytes), all of which have different functions and origins. The bone matrix consists of 35% organic material (collagen that gives flexible resistance to the matrix) and 65% inorganic material (minerals that give resistance to compression).

The process by which bone is formed is called ossification or osteogenesis, where osteoblasts are joined to the cellular extensions of other osteoblasts in the communicating joints, forming new bone. As soon as the osteoblaste is surrounded by bone matrix, it becomes a mature cell (osteocyte).

Osteoclasts are the cells responsible for the bone resorption, they release enzymes that digest the protein components of the matrix degrading better when in contact with the mineralized bone matrix. But there is an hormone that controls bone destruction and resorption, PTH (parathyroid hormone), It stimulates bone destruction through osteoclasts and bone renewal through osteoblasts. This hormone is responsible for regulating the amount of calcium in the blood, where if there is a lack of calcium, PTH is produced in order to increase the absorption of calcium in the kidneys and small intestine, and increasing the action of osteoclasts.

Keywords: bone, cells, matrix, resorption, hormone

DEMYELINATING DISEASES

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Demyelinating Diseases are degenerative diseases related to the myelin sheath deterioration of the neurons in the central nervous system. Myelin is a lipid and protein compound that creates an enveloping membrane of axons, allowing a much faster and efficient transmission of signals throughout the neuron.

Demyelinating diseases are mostly caused by unknown factors, although it is known that some of this have genetic and hereditary causes, infectious agent or autoimmune reactions.

Multiple Sclerosis is a neurological chronic disease that affects the central nervous system, more common in the young adult, and affecting women more frequently. It has an autoimmune origin, leading to the destruction of the myelin sheath. Without this substance, the communication between the brain, the spinal cord, and other body parts is interrupted, causing an irreversible deterioration of the nervous fibers, which leads to painful inflammatory processes.

Demyelinating optic neuritis is an inflammatory process of the optical nerve. This nerve is responsible for conducting images from the retina to the brain. It is more common in adults between 20 and 40 years old and is closely linked with multiple sclerosis, often being a primary manifestation. Corticosteroids are one of the treatment options for delaying sclerosis manifestation by at least two years.

There is no cure for Demyelinating Diseases or away to prevent their progress, on the other hand exercise seems to be beneficial at multiple levels and may have an essential role in keeping a patient active and functional within the community.

Keywords: demyelinating diseases, myelin sheath, axons,

ENDOTHELIAL DYSFUNCTION, ATHEROSCLEROSIS AND ARTERIAL HYPERTENSION

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The endothelium is the internal layer of the blood vessels. It is considered an active organ and is in charge of the vascular tone's homeostasis. It is as well responsible for the production of nitric oxide which contributes to the vascular metabolism and avoids blood clotting through vasoconstriction and vasodilation.

The endothelial dysfunction leads to anomalies in nitric oxide levels which leads to the deterioration of the vascular relaxation. This may cause health problems like hipertension, atherosclerosis and cardiac insufficiency amongst others.

Hipertension is a cardiac disease associated to alterations in the arteries' functions, properties and structure. Those alterations can be observed on the endothelial cells, the muscular flat cells, the extracellular matrix and even the adventitious. They often lead to problems observed in chronic arterial hypertension cases. These cases can be treated through the changing of life habits or through medication.

Atherosclerosis is a slow progressive disease. It occurs due to the accumulation of fat, inflammatory cells and fibrous elements on the artery walls. This will cause the arteries' obstruction that can lead to a myocardial infarction or stroke. The factors that will raise the risk of development of atherosclerosis are the high levels of LDL and low levels of HDL. As the time goes by there is an increase of fat in the walls. The treatment of this disease includes the life habits' changing as well plus, the strict avoiding of risk factors.

Keywords: Nitric Oxide, Hipertension, Atherosclerosis, Endothelium

MUSCLE ADAPTATIONS TO PHYSICAL EXERCISE AND REGULATION BY THE AUTONOMIC NERVOUS SYSTEM

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Skeletal muscle is composed by two basic types of muscle fibers distinguished by their speed of contraction, slow and fast-twitch. Slow-twitch fibers have relatively slow contractile speed, high oxidative capacity and fatigue resistance, relatively high blood flow capacity and high capillary density. Fast-twitch muscle fibers have fast contractile speed and are classified into two subtypes, fast-twitch type “a” (FTa) and fast-twitch type “b” (FTb). FTa fibers have moderately high oxidative capacity, are relatively fatigue resistant, relatively high blood flow capacity and high capillary density. FTb fibers have low oxidative capacity, low fatigue resistance, fast contractile speed, low blood flow capacity and capillary density. Endurance athletes have more slow-twitch fibers, while sprinters legs, for example, have predominantly fast-twitch fibers.

During acute aerobic exercise there is an increase in sympathetic nervous activity, heart rate and cardiac output since the blood flow to specific tissues is regulated in proportion to metabolic activity. This means that during exercise most of the cardiac output is diverted to the active muscles.

Chronic adaptations of the skeletal muscle, induced by physical exercise, origin muscular hypertrophy and increased mitochondrial function in skeletal muscle. The hypertrophy of these fibers is the result of the increase in the dimensions and number of myofibrils present in this fibers. Prolonged endurance training can lead to a transition of FTb fibers to FTa fibers.

During exercise, the consumption of O₂ and ATP of muscle cells in activity also increases.

Keywords: Muscles, Exercise, Autonomic System

NUTRITIONAL RISK ASSESSMENT IN PEDIATRICS

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Human body growth is a complex process with different velocities during the different stages of life. Each child has their own standard of growth and maturation, and the experiences that occur in the first years of life will have a repercussion on children's biological and developmental behavior. Malnutrition is present when a deficiency or excess of energy, protein and other nutrients exists, that will cause measurable adverse effects.

Children admitted to the hospital have a high risk of developing malnutrition. A prevalence of 15 to 50% was found. Prolonged malnutrition in childhood causes growth retardation, increased susceptibility to infections, changes in healing capacity and increased behavioral problems, as well as increased health spending. If diagnosed early by identifying nutritional risk, treatments based on low-cost dietary approaches are effective and sufficient.

The identification of nutritional risk should occur within the first 24 hours after hospital admission. If there's nutritional risk, the nutrition multidisciplinary support team should be alerted, which should assess the nutritional status, defining the nutritional intervention and its monitoring.

Thus, in Portugal, the Order of Nutritionists identified 4 tools for nutritional risk screening - PNRS, STAMP, PYMS and STRONGkids. STRONGKids has been identified as the recommended instrument, as it's validated in several European populations, presenting good specificity and sensitivity. It's easy to apply and can be used since the moment of hospital admission. Besides, it doesn't implies anthropometric measurements and the subjective evaluation didn't demonstrated to be a significant bias factor.

Keywords: Malnutrition; Nutritional Risk Assessment; Pediatrics; Hospital

DIETARY RECORDS: A PROSPECTIVE METHOD TO EVALUATE FOOD INTAKE

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Background: Dietary records (DR) or food diaries are a prospective survey method to evaluate the consumption of food and beverages during a specific period of time. The information is usually recorded at the time foods are eaten.

Aim: To present the prospective methods used to evaluate food intake, including new digital tools to record dietary information.

Methodology: A literature review was conducted on the platforms Science Direct, Pubmed and B-on (articles published in 2009-2019), using the keywords “Dietary Records” and “Dietary Assessment”.

Results: DR are used in clinical and epidemiological studies to estimate the current diet of individuals and populations, as well as to identify risk groups. This method is also used during clinical practice, as a tool to implement nutritional interventions and reinforce food education. The fairly easy application and the minimal reliance on memory are some of the main advantages of DR. Some of the limitations include under and over estimation of portions, lack of literacy and training of participants. Traditionally, DR are paper-based. However, over the last years, new digital tools have been explored to facilitate data collection by the patients/participants and data analysis by dietitians/researchers.

Conclusions: Despite the disadvantages, this method is considered the golden standard of dietary assessments due to its accuracy and easy implementation. Studies comparing the use of paper based DR vs digital applications have demonstrated potential to solve the limitations of the traditional record method. However, these tools need improvement and more validation studies are needed.

Keywords: Prospective methods; food intake; dietary records

BODY COMPOSITION OF WOMEN WITH GRADE III OBESITY BY MULTIPOLAR BIOIMPEDANCE

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Introduction: Obesity is a disease classified by BMI above 30kg/m² in adults. One of the methods widely used for the evaluation of the body composition is the bioelectrical impedance (BIA) due to its high accuracy and processing speed in the information that will allow an appropriate evaluation to the obese population.

Objective: To describe the state of art of applicability of BIA method in the analysis of body composition of grade III obesity women.

Methods: A search was performed in the PubMed and B-on databases. For the selection of articles first was based on the title, followed by the reading of Abstract and the full text.

Results: Through the reading of scientific articles we could analyze that bioelectrical impedance is the most used methods in the evaluation of body composition, for example, demonstrated that body profile of the woman with grade III obesity presented a high percentage of body fat with a large accumulation of fat in the trunk and upper and lower limbs. In turn, total muscle mass is preserved. Studies show that bioimpedance is an important determinant of the fractionation of the body components.

Conclusions: The bioelectrical impedance in individuals with extreme BMI or hydration abnormalities is not recommended routinely. However, grade III obesity is a little studied case, further research is still needed at the genetic level as well as at the level of energetic expenditure.

Keywords: Body Composition; Women; Morbid Obesity; Bioelectrical Impedance

DIETARY INTAKE ASSESSMENT: RETROSPECTIVE METHODS

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Background: The dietary intake assessment is important both in individuals and population groups, allowing the detection of inappropriate eating habits in order to correct them. It also allows the implementation of healthy eating habits education programs as a way of disease prevention. This assessment can be done through direct and indirect methods, and direct methods are divided into retrospectives (post-consumption registration) and prospective ones (registration at the time of consumption).

Aim: Analyze the retrospective direct methods used for the dietary intake assessment, which are the 24-hour recall, the food frequency questionnaire and the food history, as well as showing the positive and negative aspects of each one.

Methodology: A literature review based in the keywords below was conducted using the scientific databases Google Scholar and Scielo, limiting our selection from 1999 to 2019 based on the analysis of the abstract and the full reading of the article.

Results: There are several variables that interfere with the recording and subsequent analysis of food intake, such as the interviewee's memory, culture, taboos, socioeconomic status and age. Thus, there is no ideal method for assessing dietary intake, because they all have associated errors that can affect the accuracy of the results.

Conclusion: Since there is no ideal method, the choice of the best method to apply should take into account the target population and the nature of the information to be obtained.

Keywords: Retrospective methods; Food intake; Food history; 24 hour recall; Food Frequency Questionnaire

SKINFOLDS: INDIRECT METHODS AND ITS APPLICABILITY

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Anthropometry is one of the precious instruments of nutritional assessment, having direct and indirect methods. The measurement of the skinfolds is a doubly indirect method, such as the Bicipital, Tricipital, Suprailiac-fold and (among) others. We will approach the aim of this method, its associated procedure and rigor, the evaluation locals and the instruments of use. The Skinfold method has been widely used in the assessment of body composition, with the aim of predicting relative body fat and fat mass through regression equations. It is based on the relationship between subcutaneous fat, internal fat and body density. Its accomplishment requires a prolonged training to obtain reliable results and has as difficulties the standardization of the evaluators in relation to the points of measures and the procedures adopted for the realization of the same. The values obtained despite being valid, present interferences by the participation of other tissues, resulting, therefore only in approximate values and not in the actual amount of subcutaneous fat. All measurements must be performed on the right side of the body, using a precision adipometer or lipocalibrator, performing three consecutive measurements, the final value being the average of these. This method is widely used due to its low operational cost, but requires extensive knowledge of evaluation locals and procedures, which are compatible with the chosen protocols and also their recurrent execution as a form of training for its successful and obtain reliable results.

Keywords: skinfolds; anthropometry; body composition; subcutaneous fat.

INDIRECT CALORIMETRY

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This text proposes to understand how the Indirect Calorimetry technique is used to determine energy needs.

This way, a bibliographic review of articles from the Google Academic, PubMed, ScienceDirect and SciELO database was carried out and subsequently elaborated a compilation about them.

Indirect Calorimetry is a non-invasive method that determines the nutritional needs and utilization rate of energy substrates.

The relationship between the volume of carbon dioxide and the volume of oxygen is referred to as respiratory quotient and may be important to know the type of substrate that is being oxidized by the subject under study. The QR is divided into non-protein respiratory quotient, which translates the participation of carbohydrates and lipids in VCO₂ and VO₂ and protein respiratory quotient, which represents protein metabolism.

Closed circuit equipment is connected to a mask, through which the individual inhales air of known composition (coming from a cylinder) and inhales only the spirometer air. In open circuit systems we use a breathing chamber.

The most important precautions include environmental aspects, patient-related conditions, and technical aspects related to the metabolic monitor itself.

We conclude that the method is interesting since it is the gold standard in estimating energy expenditure. However it has high costs and high limitations in a clinical setting.

Keywords: indirect calorimetry; anthropometry; energy needs

APPLICABILITY OF CIRCUMFERENCES

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Introduction: Circumferences are anthropometric measures that inform and analyze the presence of body fat and its distribution in the body, allowing to classify nutritional status of individuals. These can be applied at all stages of life.

Objective: Evaluate the relationship between calf circumference and diagnosis of sarcopenia between Japanese men and women, the relation between waist circumference and the diagnosis of multiple sclerosis in African people with HIV as well as the correlation of neck circumference with insulin resistance and metabolic syndrome components in adolescents. Thus obtaining pediatric health data.

Methodology: Review of articles on the applicability of circumferences written in English. These were searched in databases on the Google Academic and Scientific Electronic Library Online platforms.

Results: Studies have shown that calf circumference can be used as an alternative marker of muscle mass for the diagnosis of sarcopenia; Waist circumference shows good performance in diagnosis multiple sclerosis in HIV infected African people; Neck circumference proved to be a useful tool for detecting insulin resistance and for changes in metabolic syndrome indicators in adolescents.

Conclusion: The ease of application and low cost of circumferences applicability make them a very advantageous and convenient method for the diagnosis of multiple health problems, allowing their use in public health services.

Keywords: Applicability of the circumferences; Waist circumference; Calf circumference; neck circumference.

BODY MASS INDEX RELIABILITY

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Context: Body mass Index (BMI) is an international reference measure recognized by the World Health Organization (WHO), indicating the appropriate weight. Its formula is the same for all individuals, consisting of dividing the weight (in kilograms) by its height (in meters) squared.

Aim: Through the analysis of several articles we intend to acquire accurate knowledge of BMI reliability in the general population.

Methods: For the elaboration of this work, we have to resort to websites such as Google scholar and Pubmed, using the words "Body mass index" and "Reliability" as search terms. We limited our research to articles from 2019 until a maximum of 2009.

Results: The use of BMI as an indicator of nutritional status is questionable. Body fat distribution is not taken into account in its calculation. In addition to these aspects, BMI does not express the distribution of body fat, which has a great influence on health. In addition to the limitations applicable to the general population, there are also changes that occur in body composition with aging, making it even more difficult to use this to assess the nutritional status of this group.

Conclusions: BMI is not considered a reliable method to differentiate individuals according to their body composition because it cannot be considered a method of nutritional assessment by making only the relationship between weight and height of the individual.

Indeed, in some cases, such as in athletes and in individuals with edema and with Ascitis, BMI is not a reliable determination of obesity, since it does not allow distinguishing the cause of excess weight.

Keywords: Body mass index; BMI reliability; anthropometry

APPLICATION OF ALTERNATIVE ANTHROPOMETRIC MEASURES

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Introduction: Anthropometry studies the measures of the various parts of the human body, which is essential in the practice of health professionals.

However, in certain individuals, due to their health condition, it is not possible to perform a direct measurement presupposing the use of an indirect measurement.

Therefore, it is necessary for health professionals to choose an environment and the appropriate equipment to apply these alternative methods in order to reach the most precise and correct assessment possible.

Alternative anthropometric methods are simple, easy, non-invasive, low-cost and with the possibility of using portable equipment.

Objective: To understand the application and importance of alternative anthropometric measures in the health of individuals.

Methodologies: In this work we aim to understand the application of alternative anthropometric measures. Thus, we conducted a literature review based on Google Academic, PubMed and ScienceDirect, and subsequently, we elaborated a compilation of articles of the theme in question.

Results: In order to study the health applications of anthropometric measures, we chose to analyse the different ways of calculating stature.

Stature can be estimated through various indirect measures, such as the wingspan and knee height.

Conclusion: Alternative anthropometric measures are essential in certain cases where their analysis cannot be performed directly.

We can thus state that the application of these measures is crucial for the monitoring of the health status of individuals with motor limitations.

Keywords: Health; anthropometric measures; stature; wingspan; knee height

BODY COMPOSITION ASSESSMENT BY DEXA (DUAL-ENERGY X-RAY ABSORPTIOMETRY)

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Introduction: The science of body composition measurement is expanding since it plays an important role in disease detection and prevention. It is also an effective way to track progress during a diet intervention.

DEXA is a technology developed more than 30 years ago, known for its use in bone mineral density testing and although it was initially developed to measure this parameter, now it's also useful in body composition assessments.

Aims: To understand the functioning of DEXA as well as to verify its effectiveness, applicability and precision in the evaluation of body composition.

Methodology: Data collection was carried out through scientific databases Pubmed, Scielo, B-on and Science direct, using as research expression: "DEXA" AND "body composition assessment" OR "DXA" AND "body composition assessment". The results, published in the last 10 years, were first analyzed by title, then abstract and finally full text reading.

Results: This technique requires the use of x-ray beams that are attenuated according to the different body tissues in which they go through, allowing the determination of parameters such as fat mass (FM), lean mass(LM) and body mineral content (BCM).

Examination using DEXA plays a crucial role in patients with nutritional disorders and bone diseases.

Despite being a non-invasive technique with good level of accuracy, DEXA has some contraindications and the costs associated with the realization of the exam are high.

Conclusion: DEXA is considered a gold standard technique since it's one of the most advanced, precise and trustworthy methods in body composition assessment.

Keywords: DEXA; DXA; body composition assessment

INFARMED: HISTORY, IMPORTANCE AND FUTURE

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INFARMED, I.P. (National Authority for Medicinal Products and Health Products) is the Portuguese National Competent Authority (NAC) for medicines, which was created in 1993 to manage and control medicines and other health related products. The aim of this authority is to regulate and oversee all the medicines sectors, medical devices, cosmetic and body care products to the highest standards of public health protection to ensure access for health professionals and patients to these drugs with safety and effectiveness.

This bibliographic review analyzes the history, importance and future of INFARMED in order to understand this structure and evolution.

In October 2019, several research sources were found and used, such as INFARMED website, SNS (Serviço Nacional de Saúde) website and scientific articles on Google Scholar®, where 704 documents were found, published since 2015 with the keywords “INFARMED” “passado” e “futuro”. From all the documents, we selected 6 of them based on its importance.

INFARMED is a very important authority for pharmacy industry. They assure that the standards are being fulfilled, using drugs is safe and they have most of the information needed available on their website. The information available from INFARMED is a reference for both pharmacy sector and Academia in Portugal and Europe.

Nowadays, INFARMED owns a solid structure, with a critical mass scientifically known at a national and international level, being considered one of the best NACs in Europe. As technology is always evolving, this regulatory authority wants to deepen models and technological evaluation as well as being more sustainable.

Keywords: "INFARMED", "History", "Future"

HOSPITAL PHARMACEUTICAL SERVICES

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Hospital pharmaceutical services are the services that, in hospitals, ensures drugs therapy to patients, constitute a structural unit that is part of the care services provided in an hospital environment. The objective of this review is to describe the set of pharmaceutical activities carried out in hospital, which are called "hospital pharmacy activities". Information collection were performed in Google® in websites of national competent authorities namely INFARMED I.P. Hospital pharmaceutical services are headed by a Technical director, which is a pharmacist mandatorly and it is organized by sectors. Within the pharmaceutical services the pharmacy professionals can assume several functions in the supply, receipt, storage, and distribution sectors within the drug circuit. Professionals, such as pharmacists and pharmacy technicians, performs activities directly related to the drug, ensuring that medicines are available as needed by patients. These professionals are responsible for the production and quality control of medical products intended for administration to patients, either for treatment or diagnostics. There are other sectors such as, pharmacovigilance and pharmacokinetic information centers that focus more on the patient, providing him with as much information as possible to understand the therapy that has been instituted. The future of the hospital pharmacy could pass through robotics. As eg robots having been installed for example in university on California, with the reduction of drug distribution errors. Finally, the hospital pharmacy represents an important structure of a hospital environment, ensuring drug therapy to patients in the same environment, always acting for the patient's well-being.

Keywords: Hospital pharmaceutical services; hospital setting; pharmacy technician

THE COMMUNITY PHARMACIES – WHAT'S ITS IMPORTANCE?

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The community pharmacy is an healthcare public establishment, which regulated by INFARMED I.P (National Authority for Medicinal Products and Health Products), in order to provide essential services to the community, ensuring the dispensation of medicines and other medicine related products in conditions of equality and safety. This establishment, together with the National Health Service (SNS) are essential allies for the provision of proximity care, since in certain areas of the country the community pharmacies are the only health structures available.

The objective of this bibliographic review is to inform people about the importance of community pharmacies.

To accomplish this review, several sources were consulted, namely Pharmacists Chamber and Knoow websites, with the objective of gathering information about this topic.

In a pharmacy, the patient beyond access to the medicine has access to other vast products, such as veterinary medicines, medical devices, manipulated medicines, dietary supplements, comfort, childcare and cosmetics and body hygiene products.

Although its main function, the sale of prescribed medicines and over-the-counter medicines, it also offers to the user the provision of other health services, namely the measurement of biochemical and physiological parameters (ex.: blood pressure, glycaemia, cholesterol, etc.) and vaccination.

To conclude, the pharmacy is a target of huge importance to the population because these establishments are increasingly committed to developing preventive aspects, promoting healthier lifestyles, as community support for people with dependency problems or additive behaviour and the implementation of environmental prevention programmes like recycling and collection of non-term medicines.

Keywords: Medicines; Community Pharmacy; Healthcare

THE HISTORY OF PHARMACY AND MEDICINES

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The history of pharmacy and medicines is as old as the history of humanity. Pharmacy is inseparable from the history of mankind. The first “pharmacy” was founded in 760 AD, in the Arab Empire.

The objective of this bibliographic review is to understand the history of pharmacy and medicines and how it started.

Galen which is considered “father of the Pharmacy”, systematized the raw materials necessary for the preparation of medicines. Galenism dominated medical and pharmaceutical science during the XVII century, and influenced the next century. First public drug preparation and sale establishments were called “boticas”, an Arabic term meaning stores, arising together with the profession of Apothecary. Slowly the Pharmaceutical revolution started with the appearance of standard medicines. The pharmacy evolve from the apothecary and apothecaries with products of natural origin, to the actually pharmacy technology, scientific knowledge and highly qualified professionals. During last years pharmacy is deeply marked by the extraordinary progress in Organic and Analytical Chemistry.

The modern age was a time of experiments supported by scientific knowledge.

For the future of pharmacy in Portugal is expected that the new generations of professionals need to embrace digital reality with differentiating services and more personalized brand.

Keywords: pharmacy, history, medicines

VACCINES: USEFUL OR USELESS?

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Vaccination is a controversial subject: although it is considered one of the greatest health developments, there are many misconceptions on them, and several negative opinions. However, the big question that arose in the last years is if are they useful or useless?

The objective of this bibliographic review is to understand the advantages and disadvantages of vaccination, clarifying the discussion regarding vaccination behaviours.

To do that we include cases reported in France from 2006 to 2009 where we are presented the percentage of patients with undetectable plasma HIV RNA load and a case in Taiwan where we show the effectiveness of vaccination against HAV (Hepatitis A Virus).

Pros: In a meta-analysis including 8 studies, combining a total of 458 HIV-positive patients, the overall rate of serological response to HAV vaccination was 64%. Among MSM (Acronym for men who have sex with men) in Taiwan, the overall seroconversion rate among HIV-positive MSM was 39.7% and 93.4% after receiving 1 dose and completing 2-dose series of HAV vaccination, respectively. Despite that, HAV vaccination had led to a 93% reduction in the risk of acute HAV infection among HIV-positive MSM during the outbreak setting.

Cons: The members of anti-vaccination organizations claim that the government shouldn't intervene in their medical choices and that the pharmaceutical companies shouldn't be trusted to make or regulate the vaccines. The proponents affirm that vaccines save children, protecting the future generation.

In conclusion, we can see that there are several opinions about vaccines, however as science people we believe in science and numbers, so, we believe that vaccines are, indeed, useful.

Keywords: vaccines, pros and cons; advantages and disadvantages

THE HEALTH POLICY IN PORTUGAL - NATIONAL HEALTH SERVICE

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The National Health Service (SNS-pt), emerged on August 15 of 1979, is a structure through which Portugal assures the right to health to all Portuguese citizens. Currently, through the technological, socio-economic and scientific advances, it is possible to solve several health problems that were unsolved some years ago. This review intends to understand the structure of this SNS as well as its evolution. For this purpose, a bibliographic research was performed on Google® Scholar and SNS Portugal website, and scientific articles, where several documents were found, of which about nine articles were selected for further analysis.

It was understood that the health system had several changes over time and that, from the 80's onward, there was an increase in the changes in health policies. The SNS, with the objective of reducing expenditures to ensure the sustainability of health systems, has created several measures that have placed Portugal at the same level as the other European countries. Among these is the SNS Portal, a recent mobile application, which emerged in the mid-2016, which allows daily monitoring, such as access to the vaccine newsletter, scheduling appointments, prescriptions, among other information.

Therefore, the Portuguese health system intervenes in two ways, where they aim to focus on family interventions and another that addresses health problems through an approximation in the management of the disease.

Keywords: Health, policies, evolution

PROFESSIONAL OUTINGS OF A PHARMACY TECHNICIAN

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Introduction: A pharmacy technician is a title-protected, licensed health care provider who performs pharmacy-related functions, working collaboratively with pharmacists. Pharmacy technicians work in a variety of locations but can also work for long-term care facilities, pharmaceutical manufacturers, third-party insurance companies, computer software companies, in government or teaching. Job accountabilities include dispensing prescription drugs and other medical devices to patients and counseling on their use. The pharmacy technician, besides being competent and following protocols, must be a dynamic, supportive, motivated and attentive person, capable of communicating in a simple way with the population.

Search Methods: Our work was carried out according to a search based on elements of Google Scholar® and Wikipedia.

Results/Conclusion: Pharmacy technicians develop a diverse set of activities related to prevention, diagnosis, therapy and rehabilitation through the use of medications. Among them, the following are the examples where pharmacy technicians could work Community pharmacies; Hospital pharmacies; Pharmaceutical industry; Research; Teaching; Cosmetic industry and counselling; and Radiopharmacy.

It is believed that in the future the areas of expertise of a pharmacy technician may develop and act in more specialized and important sectors for health and development. It is essential that these professionals work in a precise and careful way, and must always be present that the use of medications interferes with the health and life of those who use them, hence the need for their constant development at a professional level.

Keywords: Pharmacy Technician , pharmacists, medications

TEACHING OF HEALTH TECHNOLOGY PROFESSIONS

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The history of Health professions descends from the history of medicine since health has always been a human concern. In terms of teaching itself, learning how to train a health professional has undergone several evolutions over the years.

In this review, it's intended to analyze the evolution of the teaching of health technology professions, showing the change of the curricular plans of this area over the years.

Through GOOGLE® Scholar, we had access to articles and theses conducted in the context of the study. We also used several information that was provided by some websites such as DGES. Academic recognition and the growing investment undertaken within schools promoted the expansion of the supply chain of courses and educational institutions, exchange and participation in an international level, as well as the reinforcement of the process of social-professional representation.

With the transition of the millennium and the century, 110 years after the first records on the evolution and development of these professions, several alternative models of training were designed, with the creation of courses that merged areas of the same knowledge. In the field of education, the appreciation of academic recognition (with masters and doctoral degrees) created a set of new challenges of synergies in the scientific and technological areas, increasingly dissipating the boundaries of these two dimensions. Scientific research is presented as an instrument of privileged articulation between the universe of higher education and the professional field.

Keywords: Health, Technologies, Professions

VITAMIN D SUPPLEMENTATION IN GERIATRICS

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Introduction: Vitamin D is part of the fat-soluble vitamins group and is a determining factor for the optimal functioning of many organs and tissues, besides being of relevant importance for bone health. Vitamin D also has major effects on the brain, prostate, breast, colon, heart, immune system cells, pancreas and vascular system.

The geriatric population is more susceptible to hypovitaminosis D for several reasons, including less exposure to the sunlight, inadequate diet, reduced skin production capacity, and less absorption through the gastrointestinal tract, directly reflected in the increased risk of bone fractures and development of cardiovascular diseases. Low vitamin D levels lead to decreased muscle shape, low mineralization and high levels of PTH (parathyroid hormone) which induce greater bone fragility and a higher risk of fractures.

Objective: Understand the effects of vitamin D supplementation in the geriatric population.

Methods: A literature review was conducted through research databases "PubMed" and "Google Scholar" using "Vitamin D Supplementation" AND "Geriatrics" as keywords and informative brochures. We selected about 3 articles, between 2006 and 2018, 1 brochure and a book.

Results: Seniors who have 65 to 75 years old, it is recommended supplementation of vitamin D in the dose of 800-2000 IU/day. For eldest seniors, who have more than 75 years old, it is recommended the supplementation in the dose of 2000-4000 IU/day. These results tend to be concordant or relatively close in almost every article.

Conclusion: The use of vitamin D supplementation can result in several benefits for the geriatric population, such as the improvement of life quality and the prevention against numerous cardio and bone diseases. Vitamin D supplementation should always be adequate for each patient, according to their weight, demographic characteristics of the subject and outcome.

Keywords: Vitamin D, supplementation, geriatrics, bone health, elderly.

PARENTERAL NUTRITION WITH GLUCOSE SOLUTIONS IN NEONATES

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Parenteral nutrition is the administration of nutrients directly into the vein, is used when patients don't have a functional gastrointestinal system. It is a technique widely used in premature babies who have an inadequate intake during their formation.

The goal of this research is to understand the importance of parenteral nutrition with glucose solutions in neonates.

The scientific review was based on articles published in Portuguese and English in the scientific databases Pubmed, Science Direct and Academic Google. The keywords used were: parenteral nutrition, premature newborns and glucose solutions; the timeline was 2015-2019.

Glucose is the primary energy substrate for newborns and it's particularly importante because it is the primary energy source of the central nervous system. This is born with approximately 200kcal of energy deposit, enough to provide energy up to 4 days of life. In order to avoid the use of endogenous energy deposits, sufficient energy intake should be offered to meet the costs, which are about 40kcal/kg/day. Newborns have high energy needs due to the higher proportion of the most metabolically active organs such as the heart, liver, kidneys and brain.

D-glucose (dextrose) is the carbohydrate most used in parenteral nutrition solutions; each gram provides approximately 3.4kcal/ g. To calculate the amount of glucose in parenteral nutrition, we use the infusion rate or glucose infusion velocity rate (TIG or VIG).

Episodes of hypoglycemia are associated with a bad future neuropsychomotor development and episodes of hyperglycemia are related with a higher number of complications, in addition to osmotic diuresis, the increased blood osmolality caused by these episodes can cause brain damage.

Once we were able to understand the role of glucose formulations in parenteral nutrition for the healthy growth and development of premature babies, our goal was completed.

Keywords: Parenteral nutrition; Premature newborns; Glucose solutions

CHLORELLA: IS THIS THE NEW FUTURE IN SUPPLEMENTATION?

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Introduction: Chlorella is a microscopic unicellular algae. It is a common dietary supplement used in Japan due to its amount of protein, amino acids, minerals, vitamins and pigments. It has been shown to be useful in supporting some diets. It offers a broad spectrum of possible applications and utilizations for humans, from nutritional properties to antioxidant and anti-ageing, also considering the preventative effects. Chlorella has also been extensively investigated due to its beneficial effect on immune function.

Objective: The aim of this study is to understand the effects of chlorella supplementation.

Methods: A scientific review was conducted through research databases "PubMed", "Google Scholar" and "ScienceDirect" using the keywords "Chlorella" AND "Supplementation" AND "Nutrition". 6 articles were selected between 2015 and 2019.

Results: In a study about intensified training in athletes, subjects were randomized to receive 6g/day chlorella or placebo daily. The main findings, on that study were that daily chlorella supplementation has beneficial effects on resting secretory IgA, which may be helpful during heightened training periods.

In other study on the influence of chlorella on fatigue, 6g of chlorella were administered daily. Chlorella ingestion increased the antioxidant capacity and decreased reactive-oxygen metabolites under resting conditions.

In a study with 52 smokers, 6.3 g of chlorella were administered for 6 weeks and partial benefits were observed such as lowering the risk of certain diseases in which antioxidant states may play a pathogenic role.

Conclusion: It is concluded that chlorella may have an immunological effect, a potential to relieve oxidative stress and enhance tolerance for fatigue, but further studies are needed in order to obtain its right utilization.

Keywords: Chlorella; Supplementation; Nutrition

GARLIC SUPPLEMENTATION AND ITS ANTIOXIDANT POWER

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Introduction: Garlic has played an important dietary and medicinal role throughout the history of mankind. The therapeutic efficacy of garlic encompasses a wide variety of ailments, including cardiovascular, cancer, hepatic and microbial infections. Reactive oxygen species (ROS) seem to be at the core of many disease processes, and it is an attractive and convenient hypothesis that garlic might exert its activities through modulatory effects on ROS.

Objective: Characterize and understand garlic's antioxidant power.

Methods: This study was based on the review of five articles found on "PubMed", "Google Scholar", dating from 2014 to 2018, using the keywords "Garlic Extract", "Supplementation" and "Antioxidant".

Results: A scientific review on garlic and its antioxidant potential churned up a large amount of data. Various preparations of garlic, mainly aged garlic extract (AGE), have been shown to have promising antioxidant potential. Assays regarding garlic's antioxidant activity such as free radical-scavenging capacity (RSC) and lipid peroxidation (LP) were conducted. RSC was assessed by measuring the scavenging activity of garlic extracts on 2,2-diphenyl-1-picrylhydrazyl (DPPH) and hydrogen peroxide. All the assessed extracts were able to reduce the stable DPPH into DPPH-H (its reduced form), reaching 50% of reduction. Randomized, double-blind clinical studies also find that consuming two to three capsules a day containing 500 mg of garlic extract can improve the immune system.

Conclusion: It has been proved that the use of garlic supplementation can protect against oxidative damage, lower the risk of injury to vital molecules and may help prevent the progression of the disease.

Keywords: Antioxidant Power, Extract, Garlic, Nutrition, Supplementation

SACCHAROMYCES BOULARDII IN THE TREATMENT OF DIARRHEA

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Introduction: In order to improve the host's life with prevention and treatment of diseases, it has been of great interest the use of microorganisms that show beneficial effects designated as a generical noun of probiotics.

Objective: The aim of this investigation is to describe the *Saccharomyces boulardii*'s probiotic effect acute diarrhea and diarrhea associated with antibiotic use in pediatrics.

Methods: In this regard, the research was done based in scientific research in databases. Afterwards, nine articles were obtained, published between 2009-2016; however, only eight were selected. The keywords used in this research were: *Saccharomyces boulardii*, diarrhea and probiotics.

Results: After the scientific investigation, it was found that *Saccharomyces boulardii* presents results similar to conventional medicine used in the treatment of diarrhea associated with the use of antibiotics and acute diarrhea when administered in a dose of 250mg, twice a day and in a dose 200mg, three times a day, respectively.

In addition to this, it is estimated that *Saccharomyces boulardii* can be used for treatment of different types of diarrhea such as traveller's diarrhea and diarrhea associated with *Helicobacter pylori*.

Conclusion: In conclusion *Saccharomyces boulardii* doesn't change the intestinal morphology or the resident intestinal microbiota and shows efficacy at referenced doses for pediatric conditions of diarrhea associated with the use of antibiotics and acute diarrhea.

Keywords: *Saccharomyces boulardii*, diarrhea and probiotics

CAN VITAMIN C IMPROVE SKIN HEALING AND SLOW AGING?

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Introduction: Vitamin C, also known as ascorbic acid, is a water-soluble vitamin that plays a crucial role in many cellular processes against reactive oxygen species that cause oxidative stress. It plays an essential role in various processes such as hydroxylation reactions and collagen synthesis, which allows connective tissue cicatrization. Humans cannot synthesize vitamin C, so it is obtained by eating food or by supplementation.

Objective: Determinate if there is a direct relationship between levels of vitamin C and collagen synthesis.

Material & Methods: Our search was based on Pubmed's database with keywords: Collagen synthesis" AND "Supplementation" AND "Vitamin C"; "Collagen" AND "Skin" AND "Vitamin C"; "Supplementation with vitamin C" AND "Collagen Synthesis", within 10 years, we found 58 review articles, of which we selected 6.

Results: The search was based on 6 scientific articles which said that vitamin C rich eating habits might be more effective in significantly improving long-term collagen synthesis than a short-term vitamin C supplementation regime. In non-pathological situations, the recommended daily dose is 40mg to 120mg/day, but this may vary according to age, gender or risk group. Cashew nuts contain 219mg per 100g while 200ml pineapple nectar contains 82mg and an orange nectar contains only 50mg of vitamin C. When recurrence of food is not sufficient to establish basal levels of vitamin C, it uses supplementation that can be done intravenously, orally or topically, as in the case of scurvy, where the recommended daily dose ranges from 100mg to 300mg.

Studies conducted in connective tissue show that vitamin C increases collagen synthesis by favouring the healing process of an injury to muscles, ligaments or bone fracture.

Conclusion: Concludes that vitamin C is an intervening factor in collagen synthesis promoting healing tissues and decreased oxidative stress, which slows aging

Keywords: Vitamin C, Collagen, Collagen Synthesis, Supplementation, Aging, Cicatrization

SUPPLEMENTS IN CARDIOVASCULAR DISEASES: ÓMEGA 3

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Introduction: Cardiovascular diseases are considered the first cause of death in developed countries; Omega-3 is a compound that contains eicosapentaenoic acid and docosahexaenoic acid, which are omega-3 fats. The two bioactive molecules are essential nutrients with roles important at the development, cardiovascular health. These reduce cholesterol production, which delays the progress of atherosclerosis.

Objective: This research aims to study the effects of omega 3 supplements on cardiovascular, diseases.

Methods: For this review, databases such as PubMed and Google Scholar were consulted.

Results: Studies performed in vitro and in vivo reported a variety of changes in cell surface expression, protein levels and mRNA expression, depending on the treatment with eicosapentaenoic acid Nutritional docosahexaenoic acid.

On the other side, studies have been done in which the intake of omega 3 did not change any result or increase some markers.

Only if dietary needs cannot be met and prescribed by a doctor or nutritionist, can supplements be used to ensure proper intake and use of omega 3. Nutritional supplements are not medicines, do not need a prescription, so don't require a demonstration of efficiency and / or safety. Thus, these supplements are not "pure" and may contain other undesirable components.

Conclusion: From the studies above, it can be concluded that EPA and DHA act by reducing the expression of adhesion molecules, which causes a decrease in endothelial interactions.

Therefore, it exists a reduction in the development of atherosclerosis that provides the prevention of cardiovascular diseases, since one of the causes of these pathologies are the high levels of EPA and DHA.

Keywords: Food supplements; Omega 3; cardiovascular diseases; EPA and DHA.

CONJUGATED LINOLEIC ACID (CLA) IN OBESE OR OVERWEIGHT PEOPLE

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Introduction: Conjugated linoleic acids (CLAs) are polyunsaturated fatty acids that are found naturally in ruminant animal food products. To date, there are at least 28 known isomers of CLA, defined by two conjugated double bonds in different geometric (i.e., cis or trans) and positional locations.

Biochemical studies demonstrate a considerable variation of biological benefits associated with CLA, which in addition to proving antimutagenic and anticarcinogenic properties, also acts in the reduction of cytotoxic agents in carcinogenic cells.

Objective: Understand the effects of CLAs in an obese or overweight population.

Methods: A literature review was conducted through research databases "PubMed" and "Google Scholar" using the following keywords "CLAs" AND "supplements benefits". The time- space used was between 2002 and 2019.

Results: We selected about 5 articles. The CLA has proven to be safe when administered at a dose of 3-4 g/day in obese or overweight individuals. The CLA supplementation no longer has beneficial effects when it is done for more than 2 years. The body reduction was most evident at doses of 3-4 g per day for 12 weeks in obese or overweight individual. Further studies are needed, especially in the long term, that can minimise differences between individuals along the experimental plane.

Conclusion: The CLA triggers immune response against atherosclerosis, presents hypocholesteronic property and acts in the prevention of diabetes mellitus and obesity, and is considered a powerful antioxidant.

Keywords: "CLAs" and "supplements benefits"

WHEY PROTEIN SUPPLEMENTATION IN MUSCLE HYPERTROPHY

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Introduction: The nutritional intake in the context of a hypertrophy training can affect body composition, the increase of muscle mass and strength. Whey protein seems to promote a reduction in body fat, improve hypertrophy, and other potential health benefits. This protein is one of the highest quality proteins due to its amino acid content (especially leucine) and to the rapid digestibility. Whey protein consumption has a robust ability to stimulate muscle protein synthesis. There are 3 types of whey protein: controlled, insulated and hydrolysed

Aim: The goal of this research is verifying the efficacy of the use of whey protein supplementation in athletes seeking muscle strength and mass gain.

Materials and methods: We analyzed scientific articles from 2014 to 2019, based on Pubmed and Google scholar. Keywords such as whey protein, supplement, hypertrophy, muscle mass and nutrition were used.

Results and Discussion: From scientific research, six articles were analyzed. Thus, it's estimated the analysis of 13 men over the age of 18 years and under 30 years of age. Only men with a percentage of fat mass smaller than or equal to 23% were selected. These were subjected to a resistance training for 6 months. The dose interval used was 0.3g-0.5g of Whey protein for each kg of individual body mass.

After this time the percentage of fat mass is estimated to have decreased between 0.5 - 6.6% and that free fat mass decreased between 0.3 - 2.7 Kg in 9 of the 13 men under study.

Conclusion: In short, supplementation with whey protein contributes to the increase of muscle mass and strength in athletes whose training (frequency, volume and duration) and diet are suitable for this purpose.

Keywords: whey protein, supplement, hypertrophy, muscle mass and nutrition

MORAL HARASSMENT IN WORK

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The harassment is an unwanted behavior with the objective of affecting the dignity of the worker and create an intimidating and destabilizer environment, being considered moral when it consists of verbal offensive or humiliating attacks and physical attacks.

Some of the moral harassment tactics are: verbal aggression, stonewall, exclusion, slander and physical aggression.

In the working world there are some determinant factors in the verification of moral harassment situations such as: insecurity in the work, conflicts due to positions held at work, express offensive acts related with race, sexual or religious position, physical disabilities, excessive work requirement, etc.

This usual disturbance can cause pos-traumatic stress, anxiety, depression, emotional disturbance, apathy, losing self-esteem, being annoyed and all this symptoms can conduct to suicide.

The harassment can be avoided in the following ways: create formal complaint procedures about the possible harassment situations, give informations about the advising and victim support services, create an anonymous phone line within the enterprise or public organization in a way to orientate workers to this problem, trust between all.

In conclusion, moral harassment is more common in the society these days and covers a huge number of people, even though people don't complain and with that the conviction are really few. However, it is essential to avoid these situations to spread and for that it is necessary to understand how to help as referred previously.

Keywords: moral harassment, work and victim.

GLOBAL WARMING: IS IT A URBAN MYTH?

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This paper is based in a deep search about the the existence of Global Warming. If this phenomenon exists it affects the whole world. It's an important theme because it can put all living beings at risk.

The main objective of this search, based on cientific data, is to discover if the Global Warming really exists or not.

There were announced three different approaches or theories found in different scientific papers that discuss about this problem.

As a result of this work it is possible to state that Global Warming do exist and on behalf of many scientists this phenomenon is getting worse mainly because of the greenhouse effect, being this effect enhanced by the burning of fossil fuels, usual pasture burns, industrial activity and deforestation.

In conclusion, from the obtained results we can affirm that the existence of the Global Warming is not an Urban Myth, being this a natural phenomenon aggravated by the human being activity.

Keywords: Urban Myth; Global Warming; Natural phenomenon; Human activity

GRADUATED IN ENVIRONMENTAL HEALTH – PROFESSIONAL CONTEXT

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Environmental Health covers the following areas: occupational health, environmental pollution, environmental planning, environmental policy, environmental legislation and sustainable development. It also covers water supply, quality, usage, pollution and waste. In addition, it covers air pollution, its effects on public health, quality of life and soil contamination in both rural and urban areas.

Environmental Health covers aspects of human health - including quality of life - that are determined by physical, chemical, biological, social and psychological factors of the surrounding environment. It aims to evaluate, correct, reduce and even prevent environmental factors that can, potentially, adversely affect the health of present and future generations.

In this assignment, we seek to explore what environmental health is, to educate and make the general public aware of our future profession as environmental health technician while explaining each one of the professional contexts of it.

Keywords: Environmental health, technician, professional context

LABOR ACCIDENTS: A DECADE OF WORKING ACCIDENTS IN PORTUGAL

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Labor accidents are still a reality that remains despite legislative efforts to reduce them.

There is an increase in the social perception of risk and an intensification of policies and strategies for the prevention and minimization of occupational accident risks, as well as an increase in enforcement actions for occupational safety and health standards.

After all, in Portugal, people continue to die in work accidents, unfortunately, the rates of serious and fatal labor accidents are among the highest in Europe. There are workers that become disabled for the rest of their lives, just because they were working, to earn their money.

Therefore, the future of labor accidents is overshadowed by individual and collective precariousness, socio-labor flexibility and increasing divestment in the development of more humanized companies and more sustainable production models by the human point of view

Keywords: labor accidents, prevention strategies, work security

ECO-SHOOLS: (UN)SUSTAINABILITY ON ESTESC

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The program Eco-Schools is an educational program for sustainable development, promoted by ABAE (Europe's Blue Flag Association), which addresses environmental issues, based on the Agenda 21 (Schedule 21). Some of its objectives consist on environmental awareness/education, creation of participation and citizenship habits on schools and our community.

The research that is presented here aims to analyze the context of ESTeSC as an institution that belongs to the Eco-Schools Program, having as objective evaluating the implementation of the action plan on the school and presenting suggestions of improvement on the performance of the institution towards sustainability.

The methods used were essentially the analysis of documents that already exist about this subject, the application of questionnaires to the students of ESTeSC, as well as visits to the facilities.

ESTeSC, being the first college of the country to belong to the Eco-Schools program, features a lot of sustainable practices, however there is always room for improvement.

With this investigation we've concluded that ESTeSC is an institution on an excellent path towards sustainability even though there is still need to implement measures in order to improve.

Keywords: Sustainability, Eco-Shools, sustainable practices, improvement, development

MICROPLASTICS- A MACROPROBLEM

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In its short span of life, plastic has become a huge part of our lives. Once a plant based product, it is now synthetically produced, deriving from fossil fuels, that make for a cheaper alternative. They are put under extreme pressure and heat, allowing them to be easily shaped and molded. Because of plastics global demand (due to its lightweight, versatile and strong material), its production has drastically increased, most of it ending up as trash, never being reused or recycled, compromising our environment, in particular our marine wildlife. A long exposure to the nature elements can cause them to break down into small and smaller pieces, called microplastics. These are defined as any plastic smaller than 5mm, and are divided into two types-primary (engineered to be small) and secondary (created from the breakdown of larger pieces). Because of their small size, they can accumulate in animals, potentially moving up the food chain. They can also be found in cosmetic, synthetic clothing, household items, as well as products used in the oil and gas industry. There are simple steps we can take to help reduce our exposure to microplastics such as cutting unnecessary plastic use or finding substitutions where we can, thinking first about the end life of a product, and valuing repurposing over replacing. The risk they pose to our health and how it really affects humans and animals is still unknown but with further research it will hopefully become clearer.

Keywords: Plastic, demand, breakdown, microplastics, health

CLIMATE CHANGES AND PUBLIC HEALTH

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Climate change is a factor able to change the quality of human life and consequently their health. The climate has been changing globally and all over the years, mostly because of anthropogenic activities. Several conditions lead to this climate change, like the emission of greenhouse gases. At present and in the future the consequences of that excessive emission will be notice and many of them are directly related with public health. This work will talk about the main causes and impacts of these changes on public health. There are currently studies on future climate scenarios, to try to prevent these changes and to study adaptation measures. For this effect are necessary political support, legislation, alert and raise awareness about the theme are also very important .

Keywords: Climate change. Public health. Pollution. Prevention. Greenhouse Effect.

THE KEY FOR THE RESCUE OF THE PLANET IS IN THE COWS

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The climate changes that occur from the production of meat, in this case, we are talking about cows, are considered as one of the biggest environmental, social and economic threats to the planet. The production of cow meat, not only wears out the water resources, but it is also based in nitrous oxide and carbon dioxide that are inserted in the industrial production, which is one of the major hazardous gases.

Nonetheless, one of the spotlights, nationally and internationally, is the emission of methane gas in the agricultural industry (42,6%) to the atmosphere.

The goal of this study is to evaluate and question the production of cow meat, considering the population's and the planet's health, and also to what extent does an environmental health technician can intervene, as well as raising awareness among the population about this controversial theme.

Concluding, several investigators have been trying to find solutions that reduce the emission of cow gases to the atmosphere, contributing to a better quality of life of the living beings, not finding solutions for today based on highly uncertain scenarios of what the world will be in the future.

Keywords: cow meat, emission of methane gas, planet's health

OVARIAN CANCER

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Ovarian cancer is the foremost cause of gynecological cancer death in the developed world, once is usually diagnosed at an advanced stage, being responsible for 184.799 deaths in 2018.

There are two types of ovarian cancer: Type I carcinomas slow-growing, indolent neoplasms. Type II carcinomas, which are clinically aggressive neoplasms that can develop from serous tubal intraepithelial carcinomas and/or ovarian surface epithelium.

Furthermore, due to the findings from histopathological, molecular, and genetic studies, there are several subtypes, that may include Endometrioid Carcinoma and Clear Cell Carcinoma, Mucinous Carcinoma, Low-Grade Serous Carcinoma, High-Grade Serous Carcinoma.

Birth control, breastfeeding and multiple births are known to decrease the incidence of this pathology. Contrarily, the increase of knowledge in peri and post-menopause women, the most at-risk population, yearly menarche and related to some genetic markers (BRCA).

Symptoms are often nonspecific, which difficult early detection, as a result, most of the patients present advanced-stage disease.

The diagnosis relies on patient's clinical history, a physical exam, gynecological and rectal examination. Further tests should be required, such as laboratory tests, tumor marker CA 125, transvaginal ultrasound and biopsy. Both, MRI and abdominal and pelvic CT scan help understanding the lesions and their extension.

The primary treatment includes complete resection of all visible disease (laparoscopy) plus neoadjuvant chemotherapy.

Ovarian cancer staging is based on the tumor-node-metastasis (TNM) and International Federation of Gynecology and Obstetrics (FIGO) classifications.

The anatomopathology report comprise patient's entire medical history, surgical procedure, macroscopic, microscopic and histological evidence of the injured area, and adjacent structures.

Keywords: Ovarian cancer, gynecological cancer, chemotherapy, endometrioid carcinoma

BASOCELLULAR CARCINOMA

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Basocellular Carcinoma (BCC) is the most common skin cancer worldwide representing 70–80% of skin cancers with increasing incidence. Studies shows that the estimated annual incidence for BCC in Portugal is 70 new cases per 100,000 population. Worldwide, BCC incidence is higher in men than in women and variations in ethnicity may explain its incidence, which is higher in Caucasians.

BCC rarely cause metastases but may cause tissue destruction and decreased quality of life. Even so it is not associated with mortality.

There are different subtypes of BCC, such as nodular, superficial, pigmented and ulcerated, that manifest different clinical features. It shows up as a slow growing superficial papule or nodule, derived from epidermal cells. Tumors appear most often in exposed areas of the body, especially the face, ears and neck.

Lifetime accumulated sun exposure and occasional intense exposure events are risk factors for the development of BCCs. Some preventive measures are recommended, such as the use of sunscreen and avoid exposure in the hours of higher sun incidence.

Confocal reflectance microscopy can be used as a complementary diagnostic technique. Skin biopsies are required to confirm diagnosis and provide additional prognostic information. Once established, the selection of the therapy is dependent upon BCC characteristics and patient specific factors.

With the emergence of more effective surgical techniques, such as micrographic surgery of Mohs, radiotherapy is less frequently used in the treatment of BCC. However, since BCC is a relatively radiosensitive tumor, radiotherapy can be used as an adjuvant treatment.

Keywords: BCC; skin cancer; epidermal cells

ECTOPIC PREGNANCY

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An ectopic pregnancy occurs when a fertilized egg implants itself anywhere but the womb, such as the ovaries, abdomen or the cervix, but it usually happens in one of the fallopian tubes - this is why ectopic pregnancies are commonly called "tubal pregnancies". Although it is rare (only affects 1-2% of all pregnancies), it has a high rate of morbidity and mortality associated.

In cases of abnormal implantation, the embryo may attach to the tuba uterine, in this case, the mucosa lamina reacts like the endometrium, forming numerous decidual cells. Because of its small diameter, the fallopian tube cannot support the embryo when it begins to grow and eventually ruptures, causing extensive bleeding that can be fatal if not treated in time.

Ectopic pregnancy is directly related to tubal infection. This way, the prevention of infections like chlamydia and gonorrhea plays an important role in lowering its risk and incidence.

Ectopic pregnancies can be difficult to diagnose because their symptoms often are similar to those of a normal early pregnancy. These can include missed periods, breast tenderness, nausea, vomiting, fatigue, or frequent urination. This way, diagnosis is based on ultrasonography, hormonal assays and pelvic exams. In addition to that, there are also histological diagnosis which depend on the visualization of the placental villi or, though rarely, the embryo, because the fallopian tube is usually distended by freshly clotted blood that contains pieces of gray placental tissue and fetal parts.

In case of a confirmed ectopic pregnancy, treatment may begin by either surgery or methotrexate.

Keywords: Ectopic pregnancy, Fallopian Tube, Mucosa lamina

COLORECTAL ADENOCARCINOMA

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In 2018, worldwide, colorectal cancer was the third most common cancer, with almost 2 million new cases and the second leading cause of death among cancers, with almost 900 thousand deaths.

Colorectal adenocarcinoma is the most common subtype, representing over 95% of cases and originates from an abnormal tissue growth known as polyp that may develop into cancer, taking place in one multi-step progression model.

It can be diagnosed with several different exams (such as biopsy, colonoscopy) performed as screening and therapy monitorization, alongside other areas that help corroborate the diagnose and elaborate prognostics like macroscopy, imaging and immunohistochemistry.

Macroscopy shows the extent of the lesion and samples are collected for further histological analysis.

In terms of imaging several exams can be performed such as CT, MRI, colonoscopy, sigmoidoscopy and PET scans. The use of imaging is highly important when it comes to surveillance, diagnosis, staging, treatment and follow up.

In immunohistochemistry, we have certain low weight cytokeratins (i.e. 19 and 20) and certain antibodies like AE3 and CAM5 expressed. The most common phenotype used in diagnose is CK7/CK20. We also have CDX2, though it's not specific since it stains in adenocarcinomas with intestinal differentiation.

Treatment includes surgery, chemotherapy and radiotherapy and the way it's provided to the patient depends on the tumor's size, location, stage and overall health condition.

Keywords: colorectal adenocarcinoma, macroscopy, imaging, immunohistochemistry

SQUAMOUS CELL CARCINOMA OF THE LUNG

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Observing to all of deaths caused by cancers, 18.4% are due to lung's cancer which 11.6% of them resemble new cases per year. Looking forward to the incidence in Portugal 9.1% of the new cases are lung cancer which 16.1% of them are responsible for dead.

Bronchogenic carcinomas are accountable nearly 95% of malignant lung tumors. Several histologic classifications of bronchogenic carcinoma have been proposed but, according to the classification of WHO, we can divide this tumors into four categories, one of them is squamous cell carcinoma, making up to 35% to 50%

Squamous cell carcinoma arises most often in the hilus and in peripheral areas. In this development, it starts with a range of in situ cytologic atypia and then to metaplasia with dysplasia. Cavitation hemorrhages and necrosis are often.

Histological diagnosis is obtained by: sputum cytology, bronchial aspirate, bronchoalveolar lavage, bronchial brush, transbronchial or transthoracic FNA. These tests should be supported by imageology. This Carcinoma consistently express p63 and is negative for TTF1, also expresses CK5/6 or 34BE12.

The international TNM classification system is used to establish: tumor size, nodal status and distant metastases. According to this, there are different treatments and prognoses. The problem is the resistance to chemotherapy so, the chances of survival are low. Alternatively, treatment may be by pneumonectomy, lobectomy, or segmentectomy, depending on the tumor's stage, or radiotherapy in patients who cannot endure surgery.

With the new technologies and the advent of cancer immunotherapies are very significant, targeting the tumoral cells and stimulating the immune system.

It's imperative to study this carcinoma because it has a massive prevalence, it's correlated with smoking habits and tends to metastasize locally and slightly later than the other patterns, but its rate of growth in its site of origin is usually faster than other types.

Keywords: Lung Squamous Cell Carcinoma; diagnosis; macroscopic; microscopic; imageology.

TERATOMA

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Teratomas are benign neoplasms originated from primordial germ cells that can arise anywhere on the body. In infancy and early childhood, the most frequent locations are extragonadal (sacroccygeal region), whereas those presenting after childhood are frequently located in the gonads.

Macroscopically, teratomas appear as well-defined encapsulated masses, with cystic areas that may contain various types of materials such as hair, sebum, teeth and bone. Histologically, they are composed of several tissues with varying degrees of differentiation.

Mature teratomas are cystic tumors filled with sebum and matter derived from one or all three germinal layers (ectoderm, endoderm, and mesoderm). These tumors make up for 10-20% of all ovarian neoplasms, being bilateral on 8–15% of cases.

Immature teratomas are undifferentiated solid masses of tissue that present a rare risk of malignant development and invasion of surrounding areas. While mature teratomas are the most common ovarian tumor in young women, immature teratomas are much rarer, representing only 1% of all ovarian cancers.

Diagnosis is achieved via ultrasound, magnetic resonance imaging and computed tomography scan.

Given its typically benign nature, teratomas are treated with surgical resection. However, in cases of immature teratomas with malignant potential, this treatment must be accompanied by chemotherapy to guarantee full remission. This distinction can only be established after anatomopathological analysis and genetic studies of the tumor mass.

Keywords: Teratoma, Tumor, Histology, Macroscopy, Germ Cells

PAGET DISEASE

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Paget Disease of the Breast is a chronic eczematous pathology of the nipple-areolar complex, which represents 1-3% of all breast cancers. It is related to Invasive/In Situ Ductal Carcinoma. This disease is more common in women but can also affect men. According to the National Cancer Institute, the average age of diagnosis in women is 62, and in men, 69. Clinically, this particular type of cancer usually affects the nipple ducts, spreading to the nipple surface and the areola, which often become scaly, red, itchy, and irritated.

A nipple biopsy allows us to diagnose Paget Disease of the Breast by removing tissue for histopathological study. As most people who have this condition also have one or more tumors inside the same breast, a clinical exam should be performed to check for lumps or other breast changes. Some additional diagnostic tests may be ordered, including a diagnostic mammogram, an ultrasound exam and/or breast MRI. Beyond all that, Immunohistochemistry is also important in the diagnostic confirmation of this pathology, which expresses the markers CK-7, AE1, AE3, CEA e EMA3, 16, 17. Equally relevant is the low expression of estrogen or progesterone receptors. An overexpression of HER2 is reported in several cases and is usually associated with large, high-grade tumors with bad prognosis.

Paget Disease of the Breast is a rare condition that should be considered in the differential diagnosis of persistent nipple-areolar lesions, to allow for early breast cancer detection.

Keywords: Paget Disease, nipple-areolar lesion

PRADER-WILLI SYNDROME

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Prader-Willi syndrome (SPW) is defined as a multisystemic disorder characterized by short stature, mental retardation, hypotonia, hyperphagia with childhood onset and obesity. This is the most common cause of chronic obesity of genetic origin in humans.

The syndrome is caused by the absence of expression of active genes of the critical region of the long arm of chromosome 15 of paternal origin (parental imprinting). Other less common mechanisms include: uniparental dyssomia, sporadic mutations, chromosomal translocations, gene deletions. The disease is most significant in the Caucasian race, being the last record of 2016 with a prevalence of 1/10.000 – 1/30.000.

Hypothalamic dysfunction seems to be responsible for many of the clinical features of the syndrome, which evolve to the behavioral and phenotypic level throughout life. SPW carriers present elevated levels of greline, which boosts food intake, increases body weight and promotes growth hormone secretion. This increase, in turn, stimulates the production of the neuropeptide Y that leads to the reduction of the growth hormone level, decreased reproductive function and hyperphagia.

The intervention involves a multidisciplinary approach aimed at improving the quality of life, preventing complications inherent to the excess weight and prolonging life expectancy. It goes through adjusting the energy supply without prejudice to the development of the individual and educating its surroundings in order to constitute an added value in the therapeutical

This study aimed to understand how nutritionists can mitigate the effects of the disease, contributing to the well-being of patients and avoiding associated problems, which can be controlled through food habits.

Keywords: nutrition; Prader Willi syndrome; obesity; genetic

NUTRIGENETICS IN GESTATIONAL DIABETES MELLITUS

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Gestational Diabetes Mellitus (GDM), defined as diabetes that is diagnosed in the 2nd or 3rd trimester of pregnancy and not evident before, is the most common metabolic disorder in pregnancy leading to short and long term complications for both the mother as for offspring, namely type II diabetes mellitus and cardiovascular disease. This condition may appear due to various mechanisms, we will focus on nutrigenetics, which studies the interactions between the mechanisms and the DNA.

Relationship has been found between some genes responsible for biosynthesis and regulation of insulin secretion (highlighting *MTNR1B*, *EEF2K*, *AKAP5*), miRNAs and lifestyle (namely adherence to the Mediterranean diet) and the onset of GDM. There is an association between clinical parameters and genetic variants associated with nutrients and metabolism in GDM.

By understanding epigenetics and nutrigenomics it is possible to discover strategies on how to prevent, delay or even treat GDM, namely through biomarkers, dietary changes and polyphenol intake, thus reducing complications for both mother and fetus.

Objective: To verify if there is a relationship between the onset of GDM, the diet and lifestyle of the pregnant woman; as well as possible treatments taking into account this relationship.

Keywords: nutrigenetics, epigenetics, gestational diabetes mellitus, genes, miRNA.

POMPE DISEASE

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Type II glycogenosis, better known as Pompe disease, is an autosomal recessive inherited disease caused by mutations in the gene encoding the acid α -glycosidase enzyme, leading to lysosomal glycogen accumulation. This disease can be classified as classic, characterized by cardiomyopathy with prominent cardiomegaly, severe respiratory failure and proximal myopathy; and not classic that displays symptoms mainly related to the involvement of skeletal and respiratory muscles.

The gene that encodes acid α -glycosidase has 19 exons, it's located on chromosome 17q25.2-q25.3 and is highly polymorphic. More than 351 mutations and alterations in the sequence of the acid α -glycosidase gene have been identified, the most frequent being c.-32-13T> G. This mutation occurs at the first intron of the acid α -glucosidase gene and leads to inadequate pre-mRNA splicing.

Enzyme replacement therapy (ERT) aims to replace the missing or deficient acid α -glycosidase enzyme in the tissues of Pompe patients by administration of the exogenous enzyme α -glucosidase- α . Non-pharmacological treatment includes exercise or physiotherapy and an adequate, low-carb, high-protein diet.

The objective of this work is to identify the genetic changes inherent to Pompe disease and the influence of nutrition on its treatment.

Keywords: Pompe disease, acid α -glycosidase, genetics, nutrition

NUTRITIONAL GENOMICS VS OBESITY AND DIABETES MELLITUS

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Nutritional Genomics is a branch of genetics, a broad term encompassing Nutrigenic, Nutrigenomic and Nutritional Epigenomics, scientific areas that evaluate how nutrients and genes interact and express each other, capable of revealing phenotypic outcomes and disease risk.

Many chronic diseases, such as obesity and diabetes mellitus, are caused by genetic and environmental factors, with nutrition playing a major role.

Several studies show that each individual's genetic profile determines different responses to specific foods or nutrients and that nutrition is an environmental factor implicated in the onset or development of metabolic diseases.

The twentieth century has made great progress in biology. The discovery of the three-dimensional structure of the double-helix DNA molecule, its self-replication and the sequencing of the human genome has led to modern molecular biology for whom diet and the interaction between some genetic polymorphisms, such as IL-6, PPAR gamma, ADRB, CPUs, LEPR, MCR, FTO, are associated with the genetics of Obesity and Diabetes Mellitus and LIPC, AdipoQ, PGC-1-alpha, FABP2 and Apo, to the conditions or factors associated with these diseases.

Ongoing research aims to improve health by personalizing diet and manipulating interactions between genes and nutrition.

Keywords: Nutritional Genomics, Genetic Polymorphisms, Obesity, Diabetes Mellitus.

ADRENOLEUKODYSTROPHY

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Adrenoleukodystrophy (ALD) is an X-linked recessive genetic disease, that mostly affects the male gender. The *ABCD1* gene is responsible for coding an enzyme, the fatty acyl CoA ligase, which has the function of transporting very long chain fatty acids (VLCFA) into the peroxisomes where they undergo beta-oxidation. Gene mutation results in dysfunction of this enzyme. Thus, VLCFA are prevented from entering the peroxisomes, accumulating in tissues, especially in the brain and adrenal glands. The effect of this excessive accumulation is the destruction of the myelin sheath, affecting the transmission of nerve impulses.

The disease can manifest itself, namely, by cognitive and motor dysfunction, behavioral changes, dysphagia, fatigue, chronic myelopathy, peripheral neuropathy and adrenal insufficiency.

Although rare, there are already major advances in the diagnosis and treatment of adrenoleukodystrophy. Diagnosis is made through medical symptom assessment, biochemical analysis and DNA analysis tests.

Treatment may include marrow transplantation, pharmacological therapy with adrenal gland hormones, as well as proper nutritional care and physical therapy. Lenti-D gene therapy is currently an innovative alternative. Treatment with Lorenzo's oil reveals beneficial contributions to symptom improvement and may reduce or retard the effects of the disease. This oil contains a mixture of triglycerides derived from oleic and erucic acids, and acts by disrupting the synthesis of fatty acids, stagnating demyelination.

The purpose of this work is to characterize the disease in the context of genetic mutations and to understand how dietary therapy can attenuate its symptoms.

Keywords: adrenoleukodystrophy; Lorenzo's oil; *ABCD1* gene

THE GENETICS BEHIND WEIGHT GAIN: ARE GENETIC TESTS TO ASSESS OBESITY RISK THE ANSWER?

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Obesity is a global epidemics and its prevalence as tripled since 1975. Although it is unquestionably related with a positive energy balance, meaning the balance between energy intake and energy expenditure, this is a multifactorial disease in which other factors also play a role. Accordingly, the genetic background of each individual is an important determinant for obesity development, with some studies pointing to inheritable factors as contributing to 25-40% of the Body Mass Index. The heritability of obesity may be divided into monogenic obesity, a rare and severe syndrome usually caused by autosomal recessive mutations in genes of the leptin-melanocortin pathway, and polygenic obesity, associated with genetic variants that predispose each individual for being overweight. Importantly, in the latter, the contribution of each polygene for obesity development is relatively small. In the last years, genome-wide association studies have enable the discovery of single-nucleotide polymorphisms and copy number variations in genes involved in satiety control, lipid metabolism and adipocyte metabolism, which contribute to common forms of obesity. Based on this knowledge, different companies have developed genetic tests to evaluate which is the predisposition of each individual for being overweight. In the era of personalized medicine, this possibility opens new perspectives in obesity management but several questions arise. The objective of this work was to understand which is the benefit of performing such test, who should perform it and why, and if they reliable or a strategy to make profit. PubMed was used as main database as well as specific company's websites.

Keywords: obesity risk; genetic test; predisposition; polymorphism.

NUTRITIONAL INTERVENTION IN GAUCHER DISEASE

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Gaucher disease (GD) is an autosomal recessive genetic disorder, particularly a sphingolipidosis. It is caused by a deficiency of the lysosomal enzyme β glucocerebrosidase (GBA), which leads to an accumulation of high levels of glucocerebroside on the macrophage lysosomal storage, which undermines lipidic metabolism. Clinical expression may present hematological, visceral, skeletal and neurological impairments, occurring at any age.

The gene of GD, can suffer different mutations, resulting in different clinical manifestations. Hence there are 3 types of GD variants- type 1 which is a nonneurological disease, whereas type 2 and 3 affect neurological pathways.

Concerning to diagnosis, blood tests should be preferred to measure enzyme activity. In order to identify the specific mutation and evaluate the progression of GD, genotyping can be performed. Regarding to treatment, Miglustat is the golden standard pharmacological therapeutic for this disease. However, it can lead to an insufficient carbohydrates digestion, meaning the diet should be low in disaccharides to ensure a good digestive tolerance.

Although GD is the most common sphingolipidosis, it continues to be a rare disease, thus it demands more investigation and improvement of the available treatment.

Nevertheless, there is a scientific agreement on the impact of nutrition, in the progression of the disease.

The objective of this review is to describe GD according to its genetic etiology and associate the role of nutrition on the treatment of GD patients.

Keywords: Gaucher disease, genetics, nutrition, Miglustat

LACTOSE INTOLERANCE: GENETIC BASIS

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Lactose intolerance is an adverse food reaction characterized by gastrointestinal and extra-gastrointestinal symptoms, which results from the inability to hydrolyze lactose due to an enzyme lactase deficiency, encoded by the *LCT* gene, in the small intestine muscle. This reaction results when more than 12g of this disaccharide is ingested.

There are 3 types of intolerance: the primary, characterized by the natural decrease of lactase production with advancing age; secondary, caused by the death of intestinal cells due to a primary disease that has a temporary duration and the congenital, known as autosomal recessive inheritance.

In the Caucasian population, the gene associated to this intolerance has the variant C13910T or A22018T on chromosome 2q21.12. On the other hand, in the African and Middle Eastern population the change occurs at position -13907 C>T. The most remote treatment for these patients is elimination of food containing lactose. Other options are currently available, such as lactase supplementation or consumption of probiotics that express β -galactosidase activity, helping to decrease the intolerance of this sugar and improve the quality of life.

Lactose intolerance affects about 70% of the world's population, leading to a decrease in dairy products consumption. The genetic sequence variations are multiple, according to the world's populations, because the consumption of dairy products is diverse. The objective of this review is understand the genetic basis of lactose intolerance.

Keywords: Lactose intolerance, genetics, lactase and *LCT* gene development.

HUNTINGTON'S DISEASE (HD)

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Huntington's disease (HD) is an autosomal dominant genetic disease caused by an elongated repetition of a three-nucleotide base sequence (CAG) in the short arm of chromosome 4 in the Huntingtin gene (*HTT*), but it repeats in greater number in the mutant gene (*mHTT*). This change makes the resulting huntingtin protein different, and when it accumulates in the brain, it can cause the death of nerve cells, especially cells of the basal ganglia and cortex.

People with HD usually have low body weight and may have increased caloric needs correlated with chorea or metabolic changes. There is evidence that maintaining slightly above desirable body weight is beneficial for disease control. HD encompasses behavioral symptoms such as depression and anxiety; cognitive symptoms, such as memory impairment and ability to concentrate; motor symptoms such as muscle contractions that, when evolved, cause changes in gait and balance. Speech and swallowing may also be affected, and all symptoms being aggravated by stress and arousal, and diminished at rest and during sleep. Being an autosomal dominant disease, it is possible to pass from generation to generation.

In short, when these symptoms are evident and there is a family history, a genetic test should be done to confirm the diagnosis. It is also necessary to understand how the pathophysiology of HD influences eating physiology, gastrointestinal function and consequently eating patterns and to adopt nutritional therapy to alleviate the symptoms and consequences of this pathology.

Keywords: Huntington's disease, nutrition, genetic

HEREDITARY HEMOCHROMATOSIS

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Hereditary hemochromatosis is an autosomal recessive disorder that occurs in approximately 1 in 200-250 individuals and normally only becomes prominent in adulthood. It's caused by genetic mutations that lead to an excessive accumulation of iron in diverse organs of the body, mainly liver, skin and joints, which, in untreated individuals, may lead to various nefarious symptoms. The diagnosis is made by detection of high levels of ferritin, iron and transferrin saturation and confirmed by a genetic test. Treatment of hemochromatosis is made through phlebotomy, iron chelating agents and diet modulation.

There are 4 types of hereditary hemochromatosis, each related with a different mutation in one of 4 genes: *HFE*, hemojuvelin, *TRF2* or ferroportin gene. All types have in common low concentrations of hepcidin, which decreases levels of iron in the plasma, and modulates absorption of dietary iron in the gut.

This disease is more prevalent in males, Caucasians, individuals whose parents carry the *HFE* gene mutation and those with close relatives with this disease. Adult hemochromatosis usually shows mutations in the *HFE* or *TFR2* genes, while juvenile hemochromatosis finds mutations in the *HJV* or *HAMP* genes. It's not recommended for individuals with this disease to consume Vitamin C and iron supplementation, red meat, alcohol and seafood.

The objective of this review is to understand the genetic components of this disease, as well as its long-term consequences for the body and direct correlation with diet.

Keywords: hemochromatosis, nutrigenomics, genes, food

VON GIERKE'S DISEASE OR TYPE IA GLYCOGENOSIS

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Glycogen storage related diseases (GSD's) consist of hereditary metabolic disorders determined by glycogen accumulation in different tissues. These diseases are caused by enzymatic deficiencies in glycogen synthesis, glycogen degradation or glycolysis, usually within the muscles and/or cells of the liver. Von Gierke's Disease is the second most common type of GSD's and is an autosomal recessive disease that manifests in childhood.

Von Gierke's disease consists of two main subtypes, GSD-Ia caused by a deficiency of glucose-6-phosphatase- α and GSD-Ib caused by a deficiency in glucose-6-phosphate transporter. In either case one of the main symptoms will be hypoglycaemia which results from the inability of the liver to replenish blood glucose. For diagnostic purposes, mutation analysis is used, combined with clinical and biochemical changes, for prenatal diagnosis, DNA is studied. Current treatment aims to prevent metabolic changes as well as attenuating growth retardation and early deterioration of renal function, it consists primarily of glycemic control and may be supplemented with pharmacological treatment.

Dietary therapies have allowed GSD-Ia patients to achieve almost normal pubertal growth and development. Proper dietary treatment can provide most adult patients with an almost normal life and decrease morbidity during childhood.

Objective: Know and understand the genetic and metabolic changes of Von Gierke's disease.

Keywords: metabolism disease, glycogenosis type 1, Glycogen storage disease type Ia (GSD-Ia); molecular genetics diagnosis

THE INFLUENCE OF NUTRIGENOMICS: CONTRIBUTION FOR THE ATHLETIC PERFORMANCE

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Genetic intra-variability among athletes allows defining an optimal nutritional strategy, improving their performance. The interaction between genes and nutrients is key to understand the contribution of nutrition in each athlete. Vitamin C is related with peak oxygen consumption in athletes and circulation levels of acid ascorbic are connected with *SLC23A1* and *SLC23A2*. Variation associated with the *SLC23A1* and *SLC3A2* should not be used for personalized dietary recommendations given that no gene-nutrient causality was observed. Calcium intake is a robust determinant of bone fracture which in turn is related with injuries in sport. Meanwhile, the GC gene genotype in athletes and a low dietary have a direct impact on stress fracture. The impact of specific genes (e.g. *ADORA2A*) during the metabolism of particular components, such as caffeine, proves the inter-relationship between gene and metabolism and explain a great proportion of variance in training variables. Apparently, caffeine is the most examined compound and combining with genetic appear to be determinant to explain sports performance. Finally, genetic tested is claimed as a complementary tool for personalized nutrition to increase the performance among athletes. Note, however, the literature is lacking on the impact of gene-nutrition interactions in laboratory assessment outcomes among athletes. The aim of the current study is describing the main nutrigenomics relationships among athletes.

Keywords: genetic testing; nutrition; sport participants; caffeine.

PHENYLKETONURIA

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Phenylketonuria (PKU) is the most common metabolic disease of aminoacidopathies. It has variable incidence, being approximately 1: 10,000 live births in Europe. It is characterized by the increase of phenylalanine (Phe) in the blood due to the deficiency of the enzyme phenylalanine hydroxylase and has great clinical heterogeneity. Patients are classified into classic or mild PKU according to Phe levels or tolerance to Phe dietary intake.

Phenylalanine accumulation in the brain is one of the mechanisms responsible for irreversible central nervous system damage in untreated PKU patients.

Newborn screening programs enable early diagnosis of patients with phenylketonuria, allowing the imposition of immediate dietary treatment and preventing irreversible mental retardation.

Phenylketonuria should be diagnosed and treated as early as possible to prevent sequels. Diet is the main pillar of the treatment. This way dietary counseling should be done properly and follow-up should persist throughout life.

Nutritional treatment is mainly based on a phenylalanine-restricted diet defined by a natural protein restriction (NP) combined with protein substitutes (PS) and low protein special foods (SLPF) to meet protein and energy requirements respectively.

In addition to health professionals the family must understand the importance of this pathology in order to ensure greater adherence.

Keywords: Phenylketonuria, Phenylalanine, Newborn screening, Nutritional treatment

LUNG CANCER

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Lung cancer (LC) is annually the most common malignant neoplasm worldwide, accounting for 1.8 million new cancer cases and 1.6 million deaths. In Portugal, it is the main cause of death in men and the third most common cause in women. An overall survival rate is 4-17% over five years, depending on the cancer stage and geographic location.

Targeted medicine is at the forefront of new cancer treatments, with the development of new drugs applied to genetic abnormalities that differ from case to case.

The treatment is based on tumour staging, where the standard therapeutic is increasingly complemented by personalized medical techniques, using drugs like Trastuzumab (targeted for HER2 oncogene) and Gefitinib (directed for EGFR positive cases).

Personalized medicine is a model in which medical practices and decisions are adapted to each individual patient. In LC the targeted treatment is based on signaling pathway inhibitors such as PDL-1 inhibitor, ALK rearrangements, EGFR tyrosine kinase inhibitors (TKIs) and KRAS according to positive biomarkers.

Studies shown promising results with the administration of these targeted drugs that, combined with immunotherapy, may be a possible solution for cure. However, as most patients are in advanced stage of disease, early detection may be a crucial factor in their survival.

Monitoring through complementary techniques such as computed tomography and chest X-Ray, should be done after treatment to assess disease progression as well as possible side effects. This kind of approach helps avoiding secondary effects of standard treatments, maintaining the quality of life of treated patients.

Keywords: Lung cancer; Tumour Staging; Targeted Medicine; Genetic Abnormalities; Immunotherapy.

COLORECTAL CANCER

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Colorectal cancer (CRC) is caused by the interaction of genetic and environmental factors and is the third most common cancer worldwide.

New biomarkers which are only present in CRC are being investigated, especially those that can be detected at an early stage of the disease and used in screening tests.

The colorectal cancers' outcome may also be improved by targeting pathways involving the CRC formation, such as anti-epidermal growth factor receptor (EGFR) therapy. Adenomatous polyposis coli (APC) and kirsten rat sarcoma viral oncogene (KRAS) mutations are considered to be early-stage developments of CRCs, whereas P53 mutations are thought to be relatively late events in the tumorigenesis of CRCs. Such biomarkers may be used for earlier diagnosis, selection of 'personalised' therapy, and prognosis of colorectal cancer.

There are some therapies more generalised such as chemotherapy, radiotherapy, surgery, and others more personalised depending on the biomarkers that are present.

There are a few therapeutic strategies based on monoclonal antibodies, that act against EGFR such as Cetuximab and Panitumumab, or Bevacizumab that acts against vascular endothelial growth factor (VEGF). There are also protein kinases inhibitors with antiangiogenic activity such as regorafenib and of topoisomerase I, such as irinotecan, which is the most common therapy used nowadays.

Overall, the use of biomarkers as a tool for personalised treatment is becoming the most accurate way to determine the prognostics and the therapeutic approach.

Keywords: colorectal cancer, biomarkers, P53, KRAS, EGFR, therapy colorectal tumours, personalised medicine, monoclonal antibodies

PANCREATIC CANCER

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In 2018, pancreatic cancer (PC) was the 14th most common cancer in the world, and the 7th most lethal.

Risk factors include: age, family history, genetic susceptibility, smoking, alcoholism and chronic pancreatitis.

The most frequent type of PC is pancreatic ductal adenocarcinoma (PDAC).

PDAC develops from a series of mutations, leading to specific precursor lesions, each with different characteristics. The most common is pancreatic intraepithelial neoplasia (PanIN).

PanIN is related to early mutations in the KRAS oncogene and telomere shortening. In an advanced stage, other mutations occur, such as P16/CDKN2A, CDKN27, P53 and SMAD4.

Several pathways are affected by the mutations in PDAC: cellular growth regulators, interaction between cell and extracellular matrix and mechanisms of DNA repair. These pathways are potentially targetable. Targetable pathways favour the use of personalized treatment. For instance, tyrosine kinase signalling, via RAS/MAPK and PI3K/AKT pathways, plays an important role in the carcinogenesis of PC. However, efforts to target these pathways haven't been successful.

Surgical resection with chemotherapy using Gemcitabine is the only potential treatment for PDAC. Most cases, when diagnosed, are in an advanced stage. 80-85% of tumours aren't resectable, hence the poor survival rate of PDAC.

CA 19-9 is used as a biomarker for monitoring the therapeutic response, as well as a relapse marker.

Novel diagnostic methods for PDAC are being developed, such as blood biomarkers, detection of cell-free DNA and tumour cells in the blood-stream, volatile compound analysis in exhaled air and Next Generation Sequencing for searching DNA mutations in pancreatic juice.

Keywords: pancreatic cancer, pancreatic adenocarcinoma, epidemiology, somatic mutation, early diagnosis, targeted therapy, personalized medicine, biomarker

ACUTE LYMPHOBLASTIC LEUKEMIA

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Acute Lymphoblastic Leukemia (ALL) is a malignant neoplasm characterized by the acute clonal proliferation of T or B lymphoid progenitors which arise from the accumulation of several somatic mutations.

The diagnose is made through myelograms, which present high blast percentage, associated with immunophenotyping of malignant lymphoid line cells as wells as with a genetic study in order to generate a complete prognosis. These studies will allow classification of several different ALL subtypes.

The first step for treatment is an induction of remission with subsequent central nervous system prophylaxis, followed by an intensification/consolidation phase and later maintenance of the hematopoietic system. This is achieved with bone marrow transplants, drugs like glucocorticoids and methotrexate as well as the classical chemo and radiotherapeutic approach.

The low survival rate and high chance of relapse caused by the traditional treatments has launched researchers into new studies involving new immunotherapeutic drugs, such as novel bispecific monoclonal antibodies (Ab) directed to specific malignant cell's antigens (CD3-CD19), Abs with alternative epitopes (CD123, CD25, CD38), improvements to personalized medicine (by reprogramming patient's own T cells with a transgene encoding the chimeric antigen receptor to identify and eliminate cells that express CD19 – CTL019) and the study of minimal residual disease, based on the PTPTex7 (NGS-PTEN) mutation sequences in T-ALL patients.

Research is ever-ongoing to optimize the usage of targeted drugs aiming to decrease the need for more cytotoxic therapies. Thus, microarrays and next generation sequencing have been providing molecular data to researchers, profiling the disease and aiming at the cure.

Keywords: Keywords: Acute Lymphoblastic Leukemia; treatment; personalized medicine; immunotherapy; Kymriah; NGS-PTEN

GASTRIC CANCER

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Gastric Cancer (GC) is the third leading cause of cancer-related death worldwide, due to nearly two-thirds of newly diagnosed GC patients present with advanced or metastatic disease. Moreover, more than 60% of the patients who received radical surgery with curative intent develop recurrence within five years. Exposure to certain environmental factor (smoking, diet, *Helicobacter pylori* and EBV infection), genetic factors, sex and age increase the risk of developing GC.

This type of cancer is classified according to the Lauren classification which is based on morphology, epidemiology, progression, genetics and clinical picture, and the World Health Organization (WHO) classification which is based on histo-morphology. Despite the development of multidisciplinary treatments, the overall survival (OS) is often short, that's why is so important to identify new types of treatment for GC.

Molecular targeted therapy acts on various mechanisms, such as proliferation inhibition, increased apoptosis and reduced neoangiogenesis. For patients with recurrent or metastatic GC, systemic chemotherapy can prolong median OS from 3-4 months to approximately 10-13 months. The combination of chemotherapy with trastuzumab can further improve the survival of patients with Human Epidermal Growth Factor Receptor 2 (HER2) overexpression. The introduction of ramucirumab can inhibit neoangiogenesis by blocking Vascular Endothelial Growth Factor (VEGF) receptor-2 and the nivolumab is a immune checkpoint inhibitor that might be a new treatment option for GC patients with Programme death (PD)-1 and PD-Ligand 1 overexpression. Furthermore, there are another targeted therapy for advanced GC, such as mTOR inhibitor (everolimus), Hepatocyte Growth Factor (HGF)/ Mesenchymal-Epithelial Transition Factor Receptor (MET) pathway targeting drugs and Fibroblast Growth Factor Receptor 2 (FGFR2) inhibitor (dovitinib), which is currently in study.

Keywords: Gastric Cancer; Molecular Targeted Therapy; Treatment; Monitoring; Lauren Classification; WHO Classification; Risk Factors.

OVARIAN CANCER

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Ovarian cancer (OC) is the most lethal among gynaecological cancer. In Portugal, in 2018, the estimated age-standardized incidence rate was 4,8 per 100 000 habitants, in females under 74 years old. This type of cancer comprises a heterogeneous group of lesions, subdivided according to the 2014 World Health Organization into epithelial, which is the most aggressive; germ cell and sex-cord stromal tumours.

The staging of OC is assigned by the tumour, node, metastasis (TNM) and by the International Federation of Obstetrics and Gynaecology systems.

The mainstays of cancer treatment are surgery, chemotherapy and radiation, in personalized medicine the most relevant genes for OC treatment are breast cancer 1, early onset (BRCA 1) and BRCA 2 because 11–15% of OC are associated with inherited predisposition related with these genes, TP53 is the most common mutated gene in the serous carcinoma, AT-rich Interaction Domain 1A (ARID1A) and Phosphoinositide 3-kinase (PI3K) mutations are common in endometriosis that can lead to clear cell carcinoma.

Nowadays, treatments include anti-angiogenic therapies, polyADP-ribose polymerase (PARP) inhibitors, leading to the development of double strand break, which are toxic to the cell. PARP plays an important role in the repair of Single Strand Breaks in DNA, through the Base Excision Repair pathway. Are also used growth factor signalling inhibitors or even folate receptor inhibitors. This last one is overexpressed in various tumours such as OC, when the receptor is blocked there's no production of methylenetetrahydrofolate which intervene in DNA's synthesis.

Keywords: ovarian cancer, ARID1A, BRCA 1, PIK3CA, PARP

PROSTATE CANCER

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Prostate cancer (PCa) is the most common noncutaneous cancer in men worldwide. In Portugal, it is estimated that by 2040, 8362 new cases of PCa will appear and 2937 people will suffer a PCa related- death.

Despite the high long-term survival in localized PCa patients after treatment, metastatic PCa remains largely incurable even after intensive therapy. This is often associated with extreme genetic and cellular heterogeneity of the tumor. Therefore, understanding the genetic drivers of PCa has been fundamental to identifying potential therapeutic targets and predicting potential outcomes of a patient's prognosis.

Androgen deprivation therapy (ADT), often combined with chemo and/or radiotherapy, remains the first-line treatment, once the majority of primary and metastatic PCa show alterations in the androgen signaling pathway. However, nearly all men with metastatic PCa develop resistance to primary ADT.

Recently, immunotherapeutic strategies have been recognized as therapeutic option in several types of cancer, including PCa. Distinct treatments, including vaccines, immunomodulating checkpoint inhibitors and immunocytokines are being studied. Sipuleucel-T, a dendritic cell vaccine (FDA approved), has been used to treat metastatic PCa that is no longer responding to hormone therapy.

Other promising new therapeutic approach includes immune checkpoint inhibitors, such as Pembrolizumab, which is a PD-1 inhibitor, suggesting immunotherapy has a new tool for cancer treatment.

The present work will focus on these treatments and others novel drugs and therapies that have been developed for the treatment of PCa.

Keywords: prostate cancer, Therapy-Related Cancer, immunotherapy, immune checkpoints inhibitors, cancer vaccines, hormone therapy

KIDNEY TUMORS

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Nowadays, kidney tumors have the ninth biggest tumor incidence in Portugal with 1,8% of all malignant tumors. It's estimated that there are about 600 to 700 new cases per year.

Renal cells carcinoma represents 90 to 95% of malignant kidney tumors being the most common type of malignant tumors in adults.

The treatment in renal cells carcinoma (RCC) has suffered multiple alterations in the past years. The study of tumors' cell biology has allowed the creation of target therapies like immunotherapy, cryoablation, ablation by radiofrequency and signalization pathways inhibition.

Immunotherapy with interleukin 2 and alpha interferon is the first therapy on RCC where there are consistent results.

The creation of target therapies led to the development of new therapy strategies trough the creation of molecules that inhibit several steps of the angiogenesis process like VEGF inhibitors. The usage of drugs that inhibit signalization pathways (therapeutic targets) may cease cell's growth. mTOR pathway is one of the described mechanisms of RCC development. Several alterations on this pathway may lead to the accumulation of HIF (hypoxia inducible factor) that when activated translocate on cell nucleus leading to the transcription of several hypoxia induced genes such as VEGF. These genes have the ability of connecting to receptors present on endothelial cell's surface resulting on cell migration and proliferation. Its inhibition will allow the reduction of this process.

The usage of these therapies allows a more directed therapy to the patient with less collateral damages and a better chance of treatment with bigger comfort.

Keywords: kidney tumors; benign tumors; malignant tumors; renal cells carcinoma; directed therapy

SELENIUM IMPACT IN THE THYROID GLAND

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Background: Selenium is an essential trace mineral first described in 1817 by the Swedish chemist Berzelius. It was not until the 90's that a relationship between selenium deficiency and thyroid dysfunction was established. Nowadays, selenium is well known for its antioxidant and anti-inflammatory properties as well as its close connection with the functioning of thyroid.

Aim: To understand how selenium affects the functioning of the thyroid gland.

Methods: Data collection was carried out through scientific databases Pubmed, Scielo, B-on and Science direct, using as research expressions: "Selenium" AND "thyroid" OR "Selenium deficiency" AND "thyroid" AND "pathology". The results, published in the last 10 years, were first analyzed by title, then abstract and finally full text reading.

Results: Selenium has an important role in immunity regulation. The studies analyzed revealed a relation between this micronutrient deficiency and the genesis of autoimmune thyroid pathology, such as Hashimoto's thyroiditis and Grave's disease. There is also a link between non-autoimmune thyroid diseases, such as myxedema cretinism, and selenium intake.

Selenium can be obtained through supplementation or food. Food is considered to be a good source of selenium if it has more than 20% of the recommended daily allowance.

Conclusion: In healthy individuals it is possible to reach the daily selenium intake through a balanced diet. However, selenium supplementation in individuals with thyroid dysfunctions has been shown to be beneficial, since it reduces oxidative damage in endemic myxedema cretinism and in autoimmune thyroid pathologies. Despite that, further studies are needed to evaluate the benefits of supplementation.

Keywords: Selenium, Selenium deficiency, Thyroid, pathology

BENEFITS OF AVOCADO IN DYSLIPIDEMIA CONTROL

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Background: Dyslipidemia is a condition characterized by qualitative and/or quantitative changes in the lipids and lipoproteins blood levels becoming the major trigger of atherosclerosis.

There are numerous factors that can contribute for abnormal lipid blood levels, being the diet considered one of the most important.

Avocado is a fruit that stands out for its excellent nutritional quality as it is rich in monounsaturated fatty acids (oleic acid), phytosterol (β -sitosterol being the most abundant), antioxidants and fibers.

Aim: The objective of this study was to understand the relationship between avocado consumption and the control of lipids blood level and its benefits in dyslipidemia.

Methods: A literature review based in the keywords “Avocado”, “Dyslipidemia”, “Phytosterol” and “Fatty acids” was conducted using the scientific databases Google Scholar, Scielo, Science direct and PubMed, limiting our selection from 2008 to 2019 based on the title, the analysis of the abstract and the full reading of the article.

Results: The analyzed studies show that avocado consumption can reduce LDL (“bad” cholesterol) and triacylglyceride levels. Regarding HDL levels, avocado consumption has been found to increase the levels of the “good” cholesterol. These results are due to phytosterol (β -sitosterol) effects which inhibit intestinal cholesterol absorption as well as it decreases the synthesis of hepatic cholesterol.

Conclusion: Avocado has a positive effect in dyslipidemia control as it reduces LDL cholesterol levels which has a protective effect in the atherosclerosis risk.

Keywords: Avocado, Dyslipidemia, Phytosterol, Fatty acids.

THE TRUTH BEHIND MILK AND ACNE DEVELOPMENT

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Background: Acne is a multifactorial disease characterized by a chronic inflammation of the skin. Recently, epidemiological data has reported an increase in the prevalence of this condition in adults. These results suggest there are other environmental mechanisms underlying this condition that are independent from the endocrine signaling of the puberty, including dietary factors, such as the consumption of milk.

Aim: To review recent literature on the association between the consumption of milk on the development of *acne vulgaris* and the influence of milk constituents on the etiopathogenesis of this disease.

Methodology: Analysis of scientific articles (2009-2019), published on the platforms Science Direct, Pubmed and B-on. The search was conducted using a combination of the keywords “acne”, “milk” and “meta-analysis”.

Results: Meta-analysis studies have shown a positive association between the consumption of milk and the occurrence of acne. Interestingly, skimmed milk seemed to increase the risk of acne development, when compared to whole milk. Recent data has indicated that milk has naturally occurring substances that stimulate the development and/or the severity of acne, including Insulin Growth Factor – 1 (IGF-1) and miRNA.

Conclusion: Despite the growing evidence pointing to a positive association between the consumption of milk and acne, it is important to consider the limitations of these studies. More research is needed in order to evaluate the influence of milk components on the development of acne.

Keywords: Milk, Acne, IGF-1, miRNA

RISKS AND BENEFITS OF GARLIC

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Background: Garlic is one of the most consumed food on human's diet being used all over the world. It presents a source of essential nutrients to the practice of healthy eating, being the object of scientific investigations and used as medicinal plant. Most of the time garlic is ingested not in its original form but processed, which leads to a change in its chemical composition.

Aim: To analyze the risks and benefits of garlic consumption in the population, evaluating its nutritional composition.

Methods: A bibliographic review was performed based on the Google Academic, PubMed and ScienceDirect. Subsequently, a compilation of articles on the subject was elaborated and analyzed.

Results: Several studies on garlic consumption have been shown to have several benefits, such as the ability to lower blood cholesterol levels, hypotensive action, and the ability to stimulate insulin secretion through weight gain. Other studies report changes in intestinal flora and duodenal lesions as examples of adverse effects on garlic consumption.

Conclusion: Garlic can have a beneficial impact on many conditions, although its mechanism of action in the body is not yet explicit. It may also have certain adverse effects. However, its consumption should prevail over the use of drugs, since it is from a natural source.

Keywords: Garlic, cardiovascular diseases, Garlic properties, Garlic composition.

THE ROLE OF CALCIUM AND VITAMIN D IN OSTEOPOROSIS

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Background: Osteoporosis is a systemic osteometabolic disease characterized by reduction of bone mass and loss of microarchitecture of bone tissue, with a consequent increase in the fragility of the bones. This pathology may be related to different causes among them: hormonal, ethnicity, age, etc. However, sedentary lifestyle and calcium and vitamin D deficiencies are easily combated and modifiable risk factors.

Aim: The objective of this review is to understand how calcium consumption and vitamin D absorption affect the incidence of osteoporosis.

Methods: A bibliographic review of articles from the Google Academic, PubMed, ScienceDirect and SciELO database was carried using the keywords: "Osteoporosis"; "Vitamin D"; "Calcium" to choose the articles.

Results: The appropriate consumption of calcium may decrease the incidence on this disease, with the absorption of this mineral dependent on vitamin D, which is obtained by sun exposure and food intake. Physical activity also provides a greater fixation of calcium in the bones. Part of the prevention of osteoporosis is the adoption of a diet rich in milk and derivatives products, nuts and fish due to their high calcium content.

Conclusion: We conclude that the role of the nutritionist is extremely important, promoting the improvement in the quality of life of the population, which can reduce the incidence of the disease.

Keywords: Osteoporosis, Vitamin D, Calcium

EGG AND CHOLESTEROL

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Background: The egg is a food of high biological value, being a source rich in proteins, unsaturated fats, liposoluble vitamins, vitamin B12 and antioxidants. The lipid fraction of the egg corresponds to 33% of the yolk weight, and cholesterol is one of its main components. This is an essential fat existing in our organism, presenting two origins: one part is produced by the organism and another obtained through feeding, and the organism needs this to intervene in the digestion of food.

Aim: The objective of this work is to study the benefits and harms that egg consumption causes in the health of individuals and to understand the relationship between the cholesterol present in the yolk and the circulating in the bloodstream.

Methods: A literature review was conducted based on several scientific articles obtained through scientific platforms, such as ScienceDirect, using to search the keyword "egg and cholesterol health problems".

Results: Studies show that through egg consumption, there are no changes in the total concentration of blood cholesterol, when added to diets with moderate amounts of cholesterol, but in populations where the consumption of foods rich in fat is low, the increase may raise the level of cholesterol in the blood.

Conclusion: In the past, the egg was stigmatized as a potentiator of cardiovascular diseases. Over the years, its consumption was encouraged due to its nutritional quality, which, like any other lipid source, should be of moderate consumption and restricted to the risk population groups only.

Keywords: Egg, Cholesterol, Egg yolk, Health

EFFECTS OF KIWIFRUIT CONSUMPTION IN SLEEP AND CONSTIPATION

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Background: Kiwifruit contains numerous phytonutrients as well as very good levels of vitamin-A, vitamin-C vitamin-E, vitamin-K and flavonoid anti-oxidants such as beta-carotene, lutein and xanthin. It contains rich levels of anthocyanins, folate, potassium, melatonin, serotonin and dietary fiber.

Aim: To evaluate the effects of the consumption of kiwifruit in sleep quality, insomnia, constipation, immunity system and irritable bowel syndrome with constipation.

Methods: A review of 9 articles found in Springer, Pubmed, Science direct, Research Gate and Scielo, from the last 10 years was made, essentially searching for keywords like “kiwifruit”, “sleep” and “constipation”.

Results: Results showed statistically significant differences in the contribution of kiwi in sleep quality and in the treatment of patients with insomnia with the consumption of 2 kiwifruit one hour before bedtime and improvements in patients with constipation and irritable bowel syndrome with constipation consuming it twice daily and routinely, respectively.

Conclusion: The consumption of kiwi, due to its rich nutritional composition, seems to have benefits not only in overall health but also as a safe and effective dietary intervention for facilitating laxation in patients with constipation problems and promoting a good quality sleep.

Keywords: Kiwifruit, Sleep, Constipation, Irritable bowel syndrome, Immunitary system.

VITAMIN D AND DIABETES MELLITUS

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Background: Diabetes mellitus (DM) is the second most common chronic disease and its incidence is increasing. Studies suggest the influence of vitamin D on its pathogenesis. In humans, only 10% to 20% of vitamin D comes from the diet, the remaining 80% to 90% are endogenously synthesized.

Aim: To perceive the influence of vitamin D on DM through the analysis of the different epidemiological studies performed, as well as the identification of possible mechanisms involved in it.

Methods: PubMed and ScienceDirect databases were used, the selection was made from the reading of the title, summary and full reading of the article, and 10 articles were selected between the 2009-2019 time frame.

Results: Existence of vitamin D receptors in various tissues, as well as their role in the immune system, have been recently discovered and have made it possible to relate it to other pathologies, including DM.

DM is a chronic autoimmune disease, which derives from genetic and environmental factors, characterized by destruction selective and progressive pancreatic β cells producing insulin. Several studies suggest an association between vitamin D deficiency and this condition, which may be justified by the modulating effect of this vitamin.

Conclusion: DM is a disease with increasing global incidence and depends on various factors. There is ample evidence to support this association, further studies are needed to explore the various mechanisms involved in the pathogenesis of this autoimmune disease, so that the role of vitamin D is clearly determined.

Keywords: Diabetes mellitus, Vitamin D, Pathogenicity, Prevention, Epidemiology

ELETROCARDIOGRAPHIC AND TENSIONAL ADAPTATIONS IN HIGHER EDUCATION TEACHERS

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Introduction: The arterial hypertension is a chronic cardiovascular disease.

International studies have revealed that 13% are masked and 13% of the office-based diagnoses on the measured blood pressure are white-coat hypertension. This is an estimated pathology that is estimated that will increase in a worldwide level. It is really important that it is early diagnosed, so that access to therapy can be faster and prevent the disease to get worse, possibly avoiding any possible heart problems, among others.

Objective: To observe any changes in tension and eletrocardiographic level in higher education teachers, more specifically the teachers of the coimbra health school (ESTeSC). Thereby, we intend to evaluate the way that the teachers' blood pressure varies over a 24-hour period, according to their activity both inside and outside of the classroom.

Methodology: Consists of the Ambulatory Blood Pressure Monitoring (ABPM), in a group of about 20 teachers of the Coimbra Health School (ESTeSC), as well as a questionnaire. There will also be an assessment of the participants' arterial stiffness, as well as a stress scale, where they will tell the level to which they are exposed in certain situations of their day.

Keywords:

HEART RATE VARIABILITY IN FUTSAL ATHLETES

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Heart rate is regulated by the sympathetic and parasympathetic systems of the autonomic nervous system, being the first more active during physical exercise and the latter during rest.

High performance athletes, such as futsal players, reveal significant improvements in physical aptitude during the training season.

Some studies show that high-volume training leads to an increase in athletes' aerobic capacity, and consequently the reduction of parasympathetic activity. This increase in aerobic capacity allows the achievement of better competitive results. However, the continued application of excessive volume training and a reduced recovery period between training sessions lead to a decline in athletes' performance, making the monitorization of heart rate variability an important tool in the management of these undesired effects.

The evaluation of heart rate variability through the electrocardiogram is an efficient, non-invasive and valuable tool that allows heart rate monitorization in athletes and, therefore, the assessment of physiological adaptations, training volume and the competitive results during the season.

The aim of this study is to evaluate heart rate variability at rest, the training volume and the competitive results of approximately twenty-five male futsal players, resorting to the electrocardiogram, for six minutes, during the pre-season and the competition season.

It is expected to find that along the season, as performance increases, athletes' resting heart rate will decrease.

Keywords:

HEART RATE VARIABILITY - HOLTER VERSUS ELECTROCARDIOGRAM

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Heart rate (HR) is under the control of the autonomic nervous system (ANS), which is formed by two nervous systems, sympathetic and parasympathetic, and its function is to coordinate the behavioral response to ensure homeostasis.

The variations existing between each heartbeat, with the subject at rest, represent the regulatory mechanism setting the rate to rate, reflecting the effects of the nervous systems and physiological mechanisms. Heart rate variability (HRV) is the measurement of the HR the time between heart beats and its analysis offers a unique method for studying the effects of ANS activity on the cardiovascular system in a variety of clinical conditions. Its measurement includes two components: the time and the frequency domain.

HRV does not imply a specific diagnosis, but rather the possibility of the presence of an early and non-specific risk factor (preceding the development of the pathological process). It is a non-invasive method, easy to perform and low cost, and is therefore a method that is increasingly being used.

This project aims to demonstrate the study and analysis of HR and its variability, by placing two distinct assessment methods side by side: Holter and ECG. A short 6-minute ECG record and a minimum 22-hour recording by Holter will be performed for each person.

We expect HRV to be similar in both methods, thus wanting to demonstrate a pattern in HR findings between the Holter and ECG of the same person, knowing that the reference exam is the ECG.

Keywords:

CIRCADIAN AND BIOLOGICAL RHYTHMS IN SHIFT WORKERS – AMBULATORY ECG AND AMBP

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Circadian rhythm is a biological rhythm that allows the maintenance of homeostasis. Processes such as cell regeneration, temperature regulation and some cardiovascular parameters like heart rate and arterial pressure follow a day/night pattern.

Shift work is a model that are increasing more and more due to the urgency of rising productivity and meeting various needs. These type of workers are constantly under stress due to office hours and the pressure that is impressed.

Therefore, shift workers have a lot of changes in heart rate and arterial pressure, for example.

It's known that the principal diseases responsible for death are cardiovascular diseases like stroke or myocardial infarction. In this way, it's very importante understand how the change that happens in wake/sleep cycle affects workers' health.

To notice how shift work determines workers' cardiovascular features we must get the measure of Arterial Pressure, Cycle Cardiac and Heart Rate through a AmBP and an Ambulatory ECG, respectively.

According to several studies already performed, it is expected to be verified a decrease in heart rate variability, obtained based on RR intervals and a modification in normal pattern of arterial pressure variation. In some cases, it turns out that arterial pressure don't low in sleep periods after a night shift and, on the contrary it seems to increase (inverted deeper).

The goal is conclude that is important understand the effects in a long way term of this type of works in health, more specifically understand cardiovascular effects.

Keywords: