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Vitex lacton Linn. bark's antioxidant activity: a comparative in vitro evaluation

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ABSTRACT:

Several human neurological disorders, including diabetes, inflammation, Alzheimer's disease, autoimmune diseases, and gastrointestinal system disorders, include free radical damage as a basic cause. Because of this, antioxidants are crucial in the fight against this illness. The current investigation seeks to compare the antioxidant activity of three different extracts of Vitex leucoxylon Linn. bark: one in ethyl acetate, one in hexane, and one in methanol. A member of the verbenaceae family, Vitex leucoxylon Linn is a traditional remedy for catarrh and headaches. After 48 hours of incubation, HIME reached 1.8964 µg/ml. The results showed that after 48 hours of incubation, HIME inhibits HT29 cells at a concentration-dependent inhibitory effect, with an IC50 value of 1.8964 µg/ml.

INTRODUCTION:

Vitex leucoxylon Linn. (Verbenaceae) commonly known as Songarbhi (Marathi) an excellent herbal crude drug in the nature which has composition of the entire essential constituent that are required for normal and good health of human. It is small to large tree with a sort thick trunk and a spreading crown and almost throughout the Deccan peninsula of India up to an altitude 900 metres, it extends northwards up to Jhansi and part of Bihar. The trees are generally found on the river bank, stream & ponds. The root and the bark are astringent and roots are used as a febrifuge. The leaves are smoked for reliving headache and catarrh and are also used for medicinal baths in fever and, anti-depressant, analgesic, antiinflammatory anaemia **1**. General pharmacological studies revealed anti-psychotic, anti-parkinsonian and anti-microbial activities of aqueous and ethanolic extracts of leaves of *V. Leucoxylon* **2.** Sarma *et al* **3** have studied the anti-inflammatory and wound healing properties of the crude alcoholic extract of the leaves in acute inflammation model **3**. The roots and bark are astringent and the roots are reported to be used as a febrifuge. β- Sitosterol, dimethyl terphthalate, vitexin, isovitexin, agnuside and aucubin were isolated from the leaves or barks of *V. Leucoxylon***4**. Majority of the diseases/disorders are mainly linked to oxidative stress due to free radicals**5**. Free radicals are fundamental to any biochemical process and antirepresent an essential part of aerobic life and metabolism **6**. The most common reactive oxygen

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Using Niosomes and Solid Lipid Nanoparticles to Encapsulate Vitamin A: A Green Assessment of Wound Healing and Histopathological Evaluation

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Abstract

Background: This study set out to use ultrasonic technology to create vitamin A (Vit A) niosomes and solid lipid nanoparticles (SLNs), and then assess how well they facilitated wound healing. A process called ultrasonication was used to create the nanoparticles. They were then analyzed using dynamic light scattering (DLS) and transmission electron microscopy (TEM). In addition, the nanoparticles were tested for a number of characteristics, including stability, pH, viscosity, spreadability, in-vitro cytotoxicity, and in-vivo wound healing. The results showed that the Vit A-niosome and SLN were indeed spherical, as predicted by TEM. In the accelerated stability test, which involves a freeze-thaw cycle, both the niosome and SLN vitamin A formulations remained stable. The release of vitamin A from SLN gel and niosome gel was much greater than that of plain vitamin A gel, at almost 70% and 80%, respectively. The animal research found that the Vit A niosomal gel and Vit A SLN gel had the best wound healing closure compared to the other groups 21 days after surgery ($P < 0.05$). Additionally, these two groups were quite close to each other throughout the trial and on day 21. Wounds treated with Vit A niosome gel or Vit A-SLN gel produced more collagen than wounds treated with other groups, according to histological data. Following 21 days, there was a notable decline in MDA malondialdehyde (an end-product of lipid peroxidation) in the Vit A-niosome and Vit A-SLN gel groups, with levels of glutathione peroxidase (GPx), superoxide dismutase (SOD), an endogenous antioxidant, and hydroxyproline showing an increase.Results: The generated vitamin A nano-formulations showed promise as a safe nano-vesicle for vitamin A cutaneous administration, which might lead to new possibilities in wound disease therapy, according to this study's conclusion.

Introduction

The subject of cutaneous wound healing has garnered significant attention in recent years, prompting researchers to investigate the fundamental processes involved and design several types of treatment strategies. The fundamental understanding of wound healing has been clarified, while there are still several particular systems that need clarity.1 The process of wound healing is a vital and dynamic biological phenomenon that consists of four interconnected phases: hemostasis, inflammation, proliferation, and remodeling.2,3 In the prevention of peroxidation of skin lipids. This process facilitates the acceleration of cell renewal and epidermal turnover, resulting in a more youthful appearance characterized by increased freshness and smoothness.7 Previous research on wound healing in animals has shown that the use of topical retinoids resulted in improved healing of full-thickness skin wounds.8 Nevertheless, it is important to note that Vit A is very susceptible to UV light and oxygen, both of which may accelerate its destruction and subsequently result in a reduction in Vit A levels at the site of the wound.9 Hence, it is essential to use a suitable drug delivery order to repair the shape and function of injured cells and tissues, it is essential that the processes and their corresponding bio-physiological aspects take place in the appropriate sequence.4,5 The principal objectives of wound care include quick wound closure, turnover of the epidermis, and the attainment of a scar that is aesthetically pleasing.6 Vit A is a lipid-soluble micronutrient that plays a crucial role in the development and maintenance of optimal skin health. Exfoliation of the outermost layer of the skin aids in mechanism in order to maintain the efficacy of this lipophilic molecule. Strategies aimed at conserving materials to ensure long-term stability and preservation of their inherent properties have garnered significant attention as a means to address these challenges. Numerous encapsulation techniques have been investigated in order to enhance the stability of retinyl acetate against various potential degrading factors.10 The investigation of niosomes and solid lipid nanoparticles (SLN) as drug-delivery vehicles has received significant attention in the

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G.Thanusha *et. al* International Journal of Pharmacetical Sciences Letters

Partitioning tablets: A risky business

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ABSTRACT

Background and Aims: Patients have a variety of reasons and tools at their disposal to divide tablets. There are two types of tablets: scored and unscored. Scoring allows for easier splitting of the tablets, but patients still run the danger of medication dosage variations, hazardous or subtherapeutic dose exposure, or both, even if there are recommendations to avoid this. The researchers set out to find out if there was a statistically significant variation in the weight of the tablet halves when divided between various demographics and measuring systems.Methods: The study used a 3-factor complete factorial design with three runs. The participants were patients, caregivers, nurses, medical professionals, and pharmacists. The tools used were scissors, pill cutters, knives, and the subjects' hands. The medications tested were warfarin, clonidine, metoprolol, and losartan. Each component and its interaction was examined for the likelihood of uneven tablet splitting using linearized generalized models. In average, the greatest weight fluctuations after splitting were seen in clonidine with patients employing scissors, and the results showed that the differences in weight were above 15% and 25% of the theoretical weight. For variations more than 15% and greater than 25%, the total chance of non-equal pill splitting was 22.5%.

The results show that dividing tablets is not a good idea since no pill was divided into equal weight halves in this research.

Keywords: Pill splitting, Patient risk, Equal weight, quantity

INTRODUCTION

Medications are often divided into smaller pieces using a variety of implements, including pill cutters, scissors, knives, scalpels, and even one's bare hands (Arnet & Hersberger, 2010; Verrue et al., 2011). A small number of patients have reported splitting the pill in half using their teeth. A line or bisect, often called a score, appears on certain tablets. This typically means that the tablets may be divided in half, with the assumption that this will ensure that the active ingredient content or weight of each half is the same. This is not always the case, however; some bisects serve purely cosmetic purposes (Rowley F, s. f., 2006; Thompson, 2012), causing individuals to mistakenly believe that they are dividing a tablet into two equal halves when in fact the drug content and weight are not equivalent. Guidelines for splitting a pill as "adequately" as feasible are even provided by state bodies such as the US Food and Drug Administration (FDA, 2013). Finding out whether individuals can successfully divide tablets into equal halves when given alternative instruments to do so is the goal of this research.

MATERIAL AND METHODS

A supermarket was shopped for knives and scissors, while a nearby pharmacy was stocked with pill cutters, brand-name warfarin and

metoprolol, and generic versions of clonidine and losartan. After completing the informed permission form, subjects were recruited in the research if they met the inclusion criteria (medical physicians, nurses, pharmacists, patients, and caregivers) and the exclusion criteria (mental illness, Parkinson's disease, and any neuromotor condition). Every occupation has its own set of three courses. There were a total of 45 caretakers, 2 female and 1 male; 75 patients, 2 male and 1 female; 50 medical physicians, 2 male and 1 female; 32 nurses, all female; and 30 pharmacists, 6 male and 2 female. Using a device and an active principle, each splitting was performed three times. Each tablet was identical. To divide them in half, metoprolol and warfarin each had one

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Instead of taking a single reading, you may take a series of blood pressure readings every 15 minutes.

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Abstract

An alternative to ambulatory blood pressure (BP) measurement that is not feasible to adopt is the thirty-minute office blood pressure (OBP-30). The objective of this research was to find out whether the chances of getting a blood pressure measurement below 140/90 would be the same if the reader was left alone for 15 minutes to take their readings. The study included 67 persons who reported having high blood pressure. Initial blood pressure (BP) was recorded at baseline and then every five minutes for fifteen minutes, with the average of the previous three measurements used to calculate the overall blood pressure (OBP-15). Normalized systolic blood pressure (4.2 points) and diastolic blood pressure (2.8 points) were lower than baseline. With OBP-15, the multivariate model increased the likelihood of BP control from 71.6% at baseline to 78.0% (p=0.011). Compared to whites, indigenous people, and people of color, as well as men and women, showed a statistically significant improvement in blood pressure management between the first measurement and the OBP-15. OBP-15 is a practical tool that, when compared to the first measurement, leads to lower blood pressure readings and an increased likelihood of blood pressure management. Hypertension, unmonitored blood pressure, serial blood pressure measurement, OBP-15

Introduction

The manual auscultatory approach has been largely superseded in clinical practice by automated office blood pressure (AOBP) monitors due to their ability to decrease human error. They are able to take an average of many blood pressure measurements after activation and may be left unattended.1 If an automated blood pressure monitor (ABPM) is not available, the American Heart Association (AHA) recommends using a validated automated oral blood pressure (AOBP) device that can record three or more measurements and average them; unattended AOBP is better than attended AOBP.1 In addition to producing lower BP values than AOBP, the thirty-minute office blood pressure measurement (OBP-30), a variant of AOBP, has also shown favorable comparisons to daytime ABPM4.5- 7 The OBP-30 procedure involves having the patient sit alone in a medical examination room for 30 minutes while a series of seven automated blood pressure readings are taken,

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Importance of Cell line Selections from Different Tissues in Cellular Survival Assays

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Abstract

Introduction: Cell culture provides a straightforward and precise method for assessing the impact of diverse variables on distinct cell lines. When doing cell culture research, choosing the correct cell line is crucial as it could have a major impact on the results. Finding out how crucial cell line selection is for cellular survival tests was the driving force for this research.

Process and Outcome: We used four distinct cell lines—A2780, A549, HT29, and MIA paca-2—as well as three commonly used pharmaceutical compounds to accomplish this goal. After 24 hours of exposure, the MTT test was used to assess the impact of cisplatin, dexamethasone, and progesterone on cell survival. Dexamethasone exhibited cytotoxic effects at high doses in HT29 cells, as well as impacts on proliferation in the A549 cell line, with no discernible effect on the A2780 and MIA paca-2 cell lines, according to the in-vitro MTT test. While all four cell lines were cytotoxic at higher progesterone concentrations, A2780 was shown to proliferate at low progesterone concentrations. Conversely, at lower doses, it failed to have any discernible impact on A549, HT29, and MIA paca-2 cells. Each of the four cell lines was cytotoxic to cisplatin at a distinct EC50.

Conclusions: This study's findings show that choosing the right cell line is critical for getting accurate results in cell culture research.

Metabolic index (MIA) paca-2, cisplatin, dexamethasone, progesterone, A2780, A549, HT29

1. Introduction

No Cell culture experiments are increasingly used in biological researches as a simple and accurate model set up for living adventures. They provide a simple system to examine hypothesis and get an initial idea on conscience events of biological interventions. Nowadays, cell culture is very much applied not only in the biological investigations, but also in biochemical, anatomical, pharmacology and toxicology, ecosystem and astronomical, physical, and even social researches. The protocols, however, are more general and focus on cell events rather than on area of application. Many important factors need to be considered in the application of cell culture experiments for an accurate and precise result and conclusion, including type of cell, culture media, experimental assay, duration of experiment, and other interfering factors. A review of thousands of published articles on this very important method presents a weakness in the precise selection of aforementioned factors. Here, and to present the importance of cell line selection for a reliable result and conclusion, we have set up a simple routine assay using different cell lines to

explore variations in a very simple concept of cell survival. Four different epithelial cell lines with distinct characteristics are selected for this purpose; MIA paca-2 is a human pancreas carcinoma cell line with epithelial morphology [1]. HT-29 is a human colorectal adenocarcinoma cell line with epithelial morphology [2]. A2780 is a human ovarian carcinoma cell line with epithelial morphology [3], and A549 is a human lung adenocarcinoma cell line with epithelial morphology [4]. All of these cell lines grow as monolayer, adherent to the culture flask.

Table 1: Cell lines characterizations

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Human cervical cancer hela cells exposed to a combination of thymoquinone and etoposide: effects on cell survival and genotoxicity

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ABSTRACT

Background and Aims: Thymoquinone is believed to have an important role in regulating DNA repair pathways, reducing DNA damage, and suppressing cancer development. Inadequate research on the cytotoxic and genotoxic effects of thymoquinone and etoposide on cervical cancer cells (HeLa) is present. Examining the impact of thymoquinone combinations on etoposide cytotoxicity and genotoxicity in HeLa cells is the main goal of this work.

Methods: Cytotoxicity was tested by MTT assay and genotoxicity was measured by Comet assay.

The results showed that thymoquinone had an IC50 value of 233.6 µM and etoposide had an IC50 value of 167.3 µM and 52.7 µM for 24 and 48 hours, respectively. Thymoquinone substantially lowered the estimated IC50 value of etoposide in dosages of 15.63 µM and above for 24 h and 31.5 µM and above for 48 h in a dose-dependent manner. 0.1-5 µM thymoquinone and 1 µM etoposide alone did not produce DNA damage, but at higher concentrations enhanced DNA damage dramatically in a dose-dependent manner. Thymoquinone significantly decreased DNA damage generated by 10 µM etoposide at the dosages of 0.1-10 µM.

Conclusion: Our results show that thymoquinone might increase the cytotoxic and genotoxic effects of etoposide in HeLa cells at high doses and reduce DNA damage at low doses that are not cytotoxic, which suggests that etoposide may increase its anticancer effect at high doses, but comprehensive studies are needed on this subject. This research is a preliminary investigation and will lead to the development of novel therapeutic options.

Keywords: Thymoquinone, etoposide, cytotoxicity, genotoxicity, comet test, HeLa cells

INTRODUCTION

Cancer is a leading cause of death, and it is among the global problems affecting public health and the economy. Cervical cancer ranks fourth in cancer-related deaths in women, according to the Global Cancer Observatory (GLOBOCAN) database (Sung et al., 2021). Radiotherapy and chemotherapy, capable of improving patients' survival considerably, are used in the treatment of cervical cancer (Green, Kirwan, & Tierney, 2001). Multiple drug regimens are preferred in chemotherapy due to drug resistance and drug-induced toxicity limit treatment. Nowadays, the combination of cisplatin and etoposide is one of the common chemotherapy regimens used (Salvo, Gonzalez Martin, Gonzales, & Frumovitz, 2019; Kluska & Wozniak, 2021).

Studies on this topic started to increase due to the positive effects of phytochemicals in cancer treatment. Current studies suggest that combinational chemotherapy of phytochemicals having different anticancer mechanisms may be successful (Xiaofei in the year 2021. Etoposide, a semi-synthetic derivative of podophyllotoxin, may block the DNA-topoisomerase II enzyme or induce DNA strand breaks by the generation of free radicals; these are its primary macromolecular effects (PubChem, 2022). During the cell cycle's late S and G2 phases, it mostly exerts its effect. It likely blocks DNA synthesis, which is how it stops the cell cycle in its premitotic phase (late S and G2). The adverse effect of etoposide that is dose-limiting is myelosuppression. It has a long list of potential adverse effects, such as sickness, vomiting, bowel irregularities (constipation or diarrhea), stomach ache, weakness, hair loss, and blurred vision (Sinkule, 1984). Cisplatin, a medication that is often used in cancer treatment, has a significant risk of drug

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The Role of Pharmacogenomics in Enhancing the Pharmacy Experience

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Abstract

The optimum personalization of pharmaceutical regimens is the dual goal of pharmacogenomics (PGx) and the medication experience (MedXp). The first method does this by analyzing a person's genetic composition, while the latter takes into account the personal experience of taking medicine. Understanding their link when used in care procedures to achieve health outcomes has been limited due to the many methods in which these disciplines of research approach their common purpose. In order to better person-centered care, this article delves into this gap and finds implications for future research that might help narrow it.

The Donabedian paradigm, medication-taking habits, pharmacogenomics, medication-experience, and person-centered treatment are all related concepts.

BACKGROUND

An individual's ideas, attitudes, and preferences toward medication use are shaped by their lived experience with drug treatment, which is sometimes referred to as the medication experience (MedXp).1- 4 A formal definition of MedXp was provided by Hillman et al. in a recent concept analysis that drew on 40 years of research. They described it as "an experience of ambivalence and vulnerability in which the patient is actively engaged in an ongoing process or negotiation, contextualized and nuanced within the social construction of their individual realities."5 Thus, the MedXp stands for crucial data and context for guiding the most appropriate pharmacological treatment decisions for an individual. Another field that aims to optimize drug treatment for each person is pharmacogenomics (PGx), which is typically described as the study of how an individual's genetic composition relates to their response to drugs.6 Despite the long-standing recognition of medication response variability, the field of PGx has shown tremendous growth in both scientific understanding and clinical use in recent decades.7 The Clinical Pharmacogenetics Implementation Consortium, the Dutch Pharmacogenetics Working Group, and other groups have published recommendations on how to

use PGx data.8,9 The major emphasis on PGx has been on its use in clinical settings and in scientific research, but it is as crucial to think about how PGx could affect the psychological aspects of pharmaceutical use. Although they use distinct person-centered methods, the MedXp and PGx both aim to optimize drug customization to each individual. This post aims to study the junction of PGx and MedXp, given the little investigation of their relationships.

Connection between MedXp and PGx

A framework that connects care procedures to outcomes is crucial as whole-person approaches to care grow increasingly personalized. The connection between MedXp and PGx may be better understood with the use of a modified Donabedian model. First, from the clinician's point of view, there is structure; second, there is process; and third, there are outcomes. These three ideas from the classic Donabedian paradigm. "Good structure increases the likelihood of good process, and good process increases the likelihood of good outcomes." This is because each category builds upon the one before it.10 First, there is the structure: a hospital policy on the reporting of drug allergies. Second, there is the process: the staff at the hospital follows protocols to avoid drug-related allergic reactions. Third, there is the outcome: fewer patient injuries caused by drug allergies. From both the clinician's and the patient's point of view, this commentary focuses on the relationship between the MedXp and the PGx as they pertain to the linking of care procedures to outcomes. Although not addressed in this article, future study in this area should prioritize including the idea of structure.

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Herbal remedies for the treatment of drug-resistant strains of Staphylococcus aureus and Escherichia coli discovered via experimental evolutionary microbiology

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ABSTRACT

The development of bacterial resistance to the majority of currently available antibiotics has emerged as one of the world's most pressing challenges in recent years. The preservation of currently available antibiotics is just as important as the ongoing search for novel antimicrobial medicines to fight MDR bacteria. Because of this, a plethora of classical and contemporary approaches have been devised; one of them is the potential use of essential oils or plant extracts.

We employed the experimental evolutionary microbiology approach to learn how various herbal compounds—including cinnamon's cinnamaldehyde, green tea's epigallocatechin gallate, turmeric's curcumin, pomegranate's punicalagin, and clove's oil—affect antimicrobial resistance prevention and delay. Standard and clinical strains of Staphylococcus aureus and Escherichia coli were subjected to escalating sub-inhibitory doses of ciprofloxacin and meropenem, with or without the addition of herbal compounds, in this investigation.

Findings: The E. coli and S. aureus control groups that received just ciprofloxacin acquired resistance. However, when herbal compounds were added to the test, resistance did not emerge. The control groups showed no resistance when exposed just to meropenem; adding the herbal medicines to the test resulted in equal minimum inhibitory concentrations (MICs), and there was only an increase in MICs.

In conclusion, the findings demonstrated that herbal compounds might potentially aid in reducing antibiotic MIC values and halting the development of resistance in the bacteria under study.

Antibiotic resistance, Staphylococcus aureus, Escherichia coli, Herbal substance, and evolutionary microbiology are all related terms.

INTRODUCTION

In both our nation (Türkiye) and globally, the issue of bacteria developing resistance to antibiotics is growing at an alarming rate. The treatment of infections, particularly nosocomial infections caused by multidrug-resistant strains, is a big concern with rising rates of morbidity and death (Koksal, Ak, Kucukbasmaci & Samasti, 2009; Kunz & Brook, 2010). Escherichia coli, Klebsiella pneumoniae, Staphylococcus aureus, Streptococcus pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa, Enterococcus and Salmonella sp., and Pseudomonas aeruginosa are the most commonly reported multi drug resistant bacteria, according to the World Health Organization (WHO, 2021). Various resistance mechanisms are put into action.

in the development of resistance, including measures to restrict drug absorption, alter drug targets, render medicines inactive via enzymes, and activate efflux pumps. Antibiotic resistance may develop more easily in certain contexts, such as when antibiotics are overused or abused, or when immunosuppressed patients are given bacteriostatic drugs (Aslam et al., 2018).

Combating antibiotic resistance is the subject of several active research projects. Research on antibiotic re-use has received more attention than that devoted to the development of novel, more potent antibiotics. According to Allen, Popat, Diggle, and Brown (2014), experimental evolution studies provide a significant idea for methods that include re-use. Research on evolutionary dynamics via carefully orchestrated field investigations and/or controlled

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Hederagenin Inhibits the Proliferation, Migration and Invasion of Laryngeal Squamous Cell Carcinoma TU177 Cells by regulating microRNA-1269 Expression

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ABSTRACT

To investigate the anti-cancer effect and mechanism of hederagenin on laryngeal squamous cell carcinoma cells. Laryngeal squamous cell carcinoma cells TU177 were divided into control group, hederagenin group (5, 10, 20 μM hederagenin), anti-microRNA-negative control group (transfected with anti-microRNA-negative control), anti-microRNA-1269 group (transfected with anti-microRNA-1269), hederagenin+microRNA-negative control group (transfected with microRNA-negative control, 20 μM hederagenin), hederagenin+microRNA-1269 group (transfected with microRNA-1269 mimics, 20 μM hederagenin). We used cell counting kit-8 and a plate replicating experiment to determine TU177 cell proliferation; the wound recuperation test to examine TU177 cell migration; the Transwell assay to identify TU177 cell assault; the Western blotting method to examine N and E-cadherin protein communication; and reverse transcription-quantitative polymerase chain reaction to evaluate microRNA-1269 expressing themselves. Compared with the control group, the inhibition rate (14.81±1.26) %, (32.94±3.22) %, (57.74±4.29) % vs. (0.60±6.00) % and E-cadherin protein expression of TU177 cells in the hederagenin (5, 10, 20 μM) group were notably increased (p<0.05), the number of clone formation, the invasion number (85.88±7.36) individuals, (70.67±5.57) individuals, (52.23±5.05) individuals vs. (119.34±12.89) individuals and the scratch healing rate [(56.91±4.85) %, (38.93±3.31) %, (24.72±2.19) % vs. (72.16±5.66) %[, N-cadherin protein expression and microRNA-1269 expression [(0.77±0.06), (0.58±0.05), (0.38±0.04) vs. (1.00±0.00)] were notably reduced (p<0.05). Inhibition of cells was much higher in the anti-microRNA-negative control group [(48.98±4.62) % vs. (5.89±0.48) %[, E-cadherin protein expression of TU177 in anti-microRNA-1269 group were notably increased (p<0.05), the number of clone formation, the invasion number [(61.36±5.13) individual vs. (118.02±11.84) individual], and the scratch healing rate (33.28±3.02) % vs. (73.11±6.39) %, N-cadherin protein expression were notably reduced (p<0.05). The rate of inhibition was much lower in the hederagenin+microRNA-negative control group (19.62±1.16) % vs. (58.35±4.72) % and E-cadherin protein expression of TU177 in the hederagenin+microRNA-1269 group were notably reduced (p<0.05), the number of clone formation, the invasion number [(91.94±7.83) individuals vs. (50.74±5.01) individuals], and the scratch healing rate (58.02±4.36) % vs. (23.07±3.02) %, N-cadherin protein expression were notably increased (p<0.05). Hederagenin has anti-proliferation, anti-migration and anti-invasion impacts on TU177 laryngeal squamous cell carcinoma cells by repressing microRNA-1269 expression.

Key words: Hederagenin, microRNA-1269, laryngeal squamous cell carcinoma, proliferation, migration,

INTRODUCTION

The most prevalent kind of head and neck cancer that develops through the laryngeal mucosal epithelium includes laryngeal squamous cell carcinoma. Laryngeal carcinoma with squamous cells is mostly treated surgically, however owing to the disease's high incidence of local penetration and posterior lymph node metastases, patient 5 y treat laryngeal squamous cell carcinoma, it is necessary to understand the molecular pathway that drives its growth. Hederagenin, a triterpenoid isolated from Chinese ivy (*Hedera helix* L.) leaves, has shown strong anti-tumor activity in research conducted *in vivo* and *in vitro* studies. Hederagenin promotes apoptosis in cervical and colorectal cancer cells *via* the mitochondria-mediated intrinsic apoptotic pathway, according to studies[2,3]. In addition, hederagenin also inhibits colon cancer cell proliferation, and invasion properties[4]. However, there are limited reports on the anti-cancer effect of hederagenin in laryngeal squamous cell carcinoma. MicroRNAs (miRNA) are short non-coding Ribonucleic Acid (RNA) molecules that play roles in cell development, differentiation, cycle regulation, regulation of apoptosis, and may control the growth of tumors by acting as tumor suppressors or cancer-causing genes. It has been reported that miR-1269 is up-regulated in gastric cancer and is involved in regulating gastric cancer cell proliferation and apoptosis[5]. Increased miR-1269 production in primary tumors that have been surgically removed is strongly correlated with malignancy recurrence and metastasis[6]. A previous pre-experiment found that hederagenin treatment significantly decreased miR-1269 expression levels in laryngeal squamous cell carcinoma cells. Therefore, in order to offer an empirical foundation for the utilization of hederagenin for the prevention and therapy of laryngeal carcinoma with squamous cell carcinoma, this research hypothesized the fact that hederagenin has anti-cancer properties and that its mechanism of action corresponds to the inhibition of miR-1269 expression, and then verified this hypothesis using *in vitro* cell investigations.

MATERIALS AND METHODS

Materials:

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The Development and Pharmacokinetic Assessments of Ondansetron Hydrochloride Medicinated Chewing Gum

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ABSTRACT

The development of a novel chewing gum device for the tablet form of ondansetron hydrochloride has been considered. Direct compression utilizing standard pharmaceutical equipment was used to generate the novel drug delivery mechanism at room temperature. The final product is a tablet form of chewing gum that has a gum core and is filled with fillers, antioxidants, a coloring agent, and plasticizers to make it easier to store and chew. Testing the therapeutic system's capacity to release the drug dose and evaluating the delivery of ondansetron hydrochloride to bypass the hepatic first pass effect are important steps in determining the system's efficacy because drug release from a dosage form is a critical step in drug absorption and bioavailability. While some of the medicine in medicated chewing gum does leak into the medium by simple diffusion, most of the dosage is released during mastication. An effort to produce ondansetron hydrochloride chewing gum was conducted in the current investigation. The gum was made in a variety of formulas, each with its own unique concentration of plasticizers such as glycerol and castor oil. Formulation II, which uses a mix of castor oil and glycerol, yields the best results in terms of formulation consistency and drug release in saliva. Formulation III, which uses glycerol alone, has slower drug release. The medication was eliminated in under 1.5 hours, according to the urinary excretion profile. When tested at a pH of 5.5, the buccal mucosa absorbed 85% of the medicine in under 15 minutes. Because of this, ondansetron hydrochloride chewing gum may be an improved formulation for the buccal drug delivery system. This method involves the drug's absorption in the buccally and its subsequent entry into the systemic circulation via the jugular vein.

INTRODUCTION:

With its many health and nutritional benefits, chewing gum is being explored as a possible "alternative drug delivery system" because of how easily the medicine may be administered via this "vehicle" or "delivery system.""solid, single-dose

preparations with a base consisting mainly of gum that are intended to be chewed but not swallowed"

is how medicated chewing gum is defined by the European Pharmacopoeia.2. They have therapeutic uses both locally and systemically, after medication absorption, for conditions affecting the buccal mucosa. Age, salivary lubrication, chronic inflammation, infections, physical damage (from cheek biting, rough dental fillings, chemical irritants, and dentures, among other things), and the oral mucosa's inherent increased permeability are additional variables that increase mucosal tissue penetration and absorption.

Chewing gum's active medicinal ingredient release rate is influenced by the drug's physico-chemical properties, the formulation's composition and manufacturing method, and the patient's chewing performance.3, 4. Patients with xerostomia or oromucosal illnesses may also experience chewing, which might modify their chewing performances. People also exhibit varying chewing durations, frequencies, and intensities.5,6. These considerations highlight the fact that the amount of medicine produced by chewing gum may vary greatly from one person to the next. We consider it to be the most crucial aspect of our study. Chewing gum is an easy way to administer medication since the medicine is absorbed by the buccal mucosal surface and travels straight to the

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The metabolites and native Prangos heyniae (H. Duman & M. F. Watson) and their The metabolites and antiityrosinase activity

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ABSTRACT

Purpose and Background: Coumarins are plentiful in Prangos Lindl. (Apiaceae). Previously, along with n-hexane(HEX), chloroform(CHCl3), and methanol(MeOH) extracts, 8 molecules named osthol(1), isoimperatorin(2), oxypeucedanin(3), 7-methoxy-isoarnottinin-4'-O-β-D-glucopyranoside(4), 7-methoxy-isoarnottinin-4'-O-rutinoside(5), oxypeucedanin hydrate-3'-O-β-D-glucopyranoside(6), 1-methylethyl-6-O-D-apio-β-D-furanosyl-β-D-glucopyranoside(7), and cnidioside A(8) were obtained from the roots of endemic Prangos heyniae H. Duman & M. F. Watson. New compounds were identified as 4 and 5. The neuroprotective effects of coumarins are well-documented. In neurodegenerative illnesses like Parkinson's and Alzheimer's disease (AD), the tyrosinase and cholinesterase enzymes, respectively, are crucial to the progression of the disease. Thus, our objective was to assess the anticholinesterase and antityrosinase activities of the root extracts and compounds 1–8 of Prangos heyniae.

Methods: The spectrophotometric evaluation of the samples indicated that they inhibited tyrosinase and acetylcholinesterase-butyrylcholinesterase (AChE-BChE). The samples were screened at a concentration of 1000 µg/mL. The IC50 values were determined by linear regression analysis and presented as the results of triplicate studies of the samples. As positive controls, antityrosinase and anticholinesterase investigations, respectively, made use of kojic acid and galantamine. The result is that the antityrosinase activity was seen only in the MeOH extract, with an IC50 value of 543.37±7.45 µg/mL. The inhibitory actions of AChE and BChE were shown by the CHCl3 extract, with IC50 values of 273.92 ± 32.07 and 38.68±2.56 µg/mL, respectively. Out of the substances that were evaluated, six exhibited moderate BChE-specific inhibitory action (IC50= 91.93±3.86µg/mL), which was forty times weaker than galantamine (IC50= 2.25 ± 0.05µg/mL).

The results showed that the CHCl3 extract effectively inhibited BChE activity. Based on these results, Prangos heyniae may be a good candidate for future research into Alzheimer's disease as a natural source for the creation of new BChE inhibitors.

Prangos heyniae, coumarin, oxypeucedanin hydrate-3'-O-β-D-glucopyranoside, anticholinesterase activity, and antityrosinase activity are all terms that pertain to this compound.

INTRODUCTION

There are 45 species of the Prangos Lindl. (Apiaceae) genus, which is an element of Iran and Turan (Lyskov, Degtjareva, Samigullin, & Pimenov, 2017). The species is distributed from Europe to Tibet, with the majority of its plants found in Iran and Turkey (Lyskov et al., 2017; Menemen, 2012; Mottaghipisheh, Kiss, Tóth, & Csupor, 2020). Aytaç & Duman (2016), B. Başer & Pehlivan (2015), Lyskov et al. (2017), Menemen (2012), and Mottaghipisheh et al. (2020) all state that species in the genus thrive on calcareous rocks, basalt rocky soils, saline soils, and mountain slopes. Behçet, Yapar, and Olgun (2019), Aytaç and Duman (2016), and Menemen (2012) count nineteen taxa, eleven of which are unique to Turkey. There are a number of documented traditional uses for plants belonging to this genus. According to Bulut, Tuzlacı, Doğan, and Şenkardes (2014), the plant's aerial parts are used as a sedative and carminative, while the roots have medicinal uses as an antihemorrhoidal, wound-healing, and aphrodisiac in Anatolian traditional medicine. Previous research by Farooq et al. (2014), Kogure et al. (2004), Massumi, Farzeli, Nasri, & Afari (2007), Özek et al. (2007), Ulubelen et al. (1995), and Zahri, Razavi, Niri, &

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Exploring the health impacts of mineral and heavy metal concentrations in wild plants with nutritional and medicinal value

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ABSTRACT

The research set out to quantify mineral and heavy metal concentrations in four wild plants: Allium orientale Boiss., Eremurus spectabilis M. Bieb., Anchusa officinalis L., and Arum elongatum Steven. These species are both nutritionally and medicinally valuable. Procedures: Inductively coupled plasma mass spectrometry (ICP-MS) was used to examine the presence and amount of 23 heavy metals and minerals.

End result: Calcium, magnesium, iron, and aluminum were the most prevalent minerals. Elements Ni, Cu, Mn, B, and Na were somewhat plentiful. Low or nonexistent quantities of toxic heavy metals like Sn, Li, Co, Se, Sb, Hg, Cd, As, and Pb were found. Both potassium (7496.435 mg/kg) and calcium (2947.378 mg/kg) were found in abundance in A. officinalis. In contrast, A. orientale and A. elongatum had quite high iron contents (1022.068 and 699.932 mg/kg, respectively). Compared to the other three plants, A. orientalale had almost double the content of magnesium (731.012 mg/kg). At 889.368 mg/kg and 651.570 mg/kg, respectively, Al was present in A. orientale and A. elongatum. Plants A. orientale, A. officinalis, and A. elongatum had Cr contents that were higher than the EPA standards and the industry norm.

The research concludes that four common wild plants utilized in alternative medicine and nutrition have different elemental profiles, heavy metal contents, and potential impacts on human health. There isn't a lot of pollution from most of the elements. Nutritional and comparative studies may also benefit from the findings, and the food and pharmaceutical businesses can find them valuable.

Mineral, medicinal plant, edible wild plant, heavy metal, nutrition

INTRODUCTION

Minerals are nutritional building blocks that play an essential role in maintaining a steady internal fluid balance, proper nerve and muscle function, proper homeostasis, enzyme and hormone activity, bone and tooth development, muscle and muscle repair, blood clotting, and many other bodily processes. Most minerals have critical roles in enzyme systems and metabolic activities, and even at threshold levels, they contribute considerably to proper development (Bhat, Kiran, Arun, & Karim, 2010). Although plants are selective in the elements they take up from the soil, heavy metals are more readily taken up by plant tissues as the soil's critical element levels rise, and these metals end up indirectly in the food chain. Some plants and processes need the elements Co, Al, Na, Si, Ni, and V, while others are important for general plant growth (C, H, O, N, P, K, S, Ca, Mg, Fe, Zn, Mn, Cu, B, Cl, and Mo) (Okcu, Tozlu, Kumlay, & Pehlivan, 2009).

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Examining the antioxidant capabilities and enzyme-inhibiting potentials of the Stachys bombycina Boiss extracts.

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ABSTRACT

Scope and Context: Roughly 300 species of Stachys L. are known to exist throughout the globe. Across Turkey, especially in the south and east, you may find more than 120 different taxa, with about 60 of them being endemic. Stachys species have a long history of medicinal usage, with applications ranging from the treatment of asthma and rheumatism to coughs, ulcers, genital tumors, diabetes, hemorrhoids, kidney stones, and a host of mental illnesses. S. bombycina Boiss., also known as "arıçayçesi" in Turkish, is a species of indigenous perennial plant that is almost endangered.

We used in vitro methods comprising radical scavenging (DPPH and ABTS), an iron-chelating assay, total phenol content (TPC) and flavonoid content (TFC) analysis, and water and methanol extracts of S. bombycina were tested for antioxidant activity. Using an in vitro spectrophotometric technique, the extracts were also examined for their effects on enzyme inhibition.

To further understand the extracts' phytochemical profiles, HPLC analysis was also used.

Conclusion: Our findings indicate that compared to the water extract, the methanol extract of S. bombycina exhibited superior radical scavenging activity against DPPH and ABTS, with IC50 values of 605.7 ± 1.04 and 19.40 ± 0.37 µg/mL, respectively. In contrast to the methanol extract, the water extract was shown to possess a greater iron chelating activity (IC50= 917.9 ± 3.55 µg/mL). The water extract had the greatest total phenolic content (TPC) at 81.07 ± 4.71 µg GAE/mg, whereas the methanol extract had a higher total flavonoid content (TFC) at 46.93 ± 1.94 µg QE/mg. Further, the water extract exhibited a significant level of anti-BChE activity (IC50= 58.09 ± 1.18 µg/mL). Furthermore, the water extract had caffeic acid as its primary component, and the methanol extract contained ellagic acid as its significant component.

In sum, As a result, no previous research has documented S. bombycina's antioxidant and enzyme inhibitory capabilities till now.

Our results on S. bombycina suggest that this study has the potential to aid in the search for naturally occurring bioactive compounds. Additionally, additional research is required to determine the specific phytoconstituents of S. bombycina that are responsible for its bioactivity and other possible biological effects.

Stachys bombycina, antioxidant properties, and enzyme inhibition

INTRODUCTION

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Evaluation of the genotoxic effects of carbamate and organophosphate insecticides using the comet assay

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ABSTRACT

Context and Objectives: The pervasiveness of pesticides in the environment makes pesticide poisoning the leading occupational risk for agricultural workers in the emerging nations. Organophosphosphate and carbamate pesticides' cytotoxicity and DNA damaging properties were the focus of this investigation.

To determine the cytotoxicity of chlorpyrifos methyl, azinphos ethyl, aldicarb sulfone, ethiofencarb, and [(O-Ethyl O-(p-nitrophenyl) pheriylphosphonothioate)] (EPN), this research used the trypan blue dye exclusion assay. To determine if pesticides administered to human peripheral blood cells had any genotoxic effects, an alkaline comet test was carried out.

Conclusion: After 30 and 120 minutes of exposure at a concentration of 100 µg/mL, we showed that EPN had a cytotoxic impact. The in vitro comet test revealed considerably greater amounts of DNA damage after 120 minutes of exposure to chlorpyrifos-methyl and azinphos ethyl, even though these pesticides seem to be less harmful in terms of cytotoxicity than other pesticides. The pesticides were ranked according to their potential DNA-damaging effects: chlorpyrifos-methyl, aldicarb sulfone, EPN, and azinphos ethyl after 30 minutes of exposure, and again after 120 minutes: chlorpyrifosmethyl, azinphos ethyl, aldicarb sulfone, and EPN. Based on our findings, these herbicides have a tendency to cause a dose- and time-dependent increase in DNA damage.

In conclusion, the DNA-damaging potential of pesticides may lead to genotoxic risk and negative health impacts like cancer. These pesticides are used extensively and may have genotoxic effects.

Genetic toxicity, in vitro comet assay, carbamate insecticides, organophosphate pesticides.

INTRODUCTION

Pesticides are often used in agriculture to enhance food production efficiency, decrease food expenses, and guarantee high-quality produce. They are chemicals with physical, chemical, and biological activities. More than 40% of the world's food supply is wasted every year due to pests, illnesses, and weeds (Jamil, Shahboob, Krishna, & Krishna, 2004; Suratman, Edwards, & Babina, 2015). Furthermore, pesticides aid in limiting the transmission of contagious illnesses. Even while pesticides have their uses, there is concern that the chemicals left behind in our food, water, air, and soil might harm us and the ecosystem (van der Werf, 1996; Ahmed, 2001). This might lead to both short-term and long-term environmental damage, upsetting the delicate ecological balance. Workers in underdeveloped countries are also at risk of chemical exposure due to the nature of their jobs, which include tasks like spraying, handling, manufacturing, and packaging. Pesticides are effective in killing off the intended pests, but they may also harm non-target creatures, including people, beneficial insects, fish, birds, and plants (Mohanty, Mohanty, Jena, & Dutta, 2011).

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Effect of MST1 on Invasion and Migration of Colon Cancer through Mitogen-Activated Protein Kinase/Extracellular Signal-Regulated Kinase Signal Pathway

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ABSTRACT

To explore the effect of mammalian STE20 like protein kinase 1 on colon cancer invasion and metastasis through mitogen-activated protein kinase/extracellular signal-regulated kinase signaling pathway. Three groups of cells were set up; blank control group, colon cancer group and mammalian STE20 like protein kinase 1 over expression group. The proliferation ability of the three groups of cells was assessed using cell counting kit 8, protein expression was detected using Western blot, the expression level of relevant messenger ribonucleic acid was determined using quantitative polymerase chain reaction, and the migration and invasion ability of the cells was evaluated using Transwell. The expression level of B-cell lymphoma 2 was markedly significantly lower reduced than that of colon cancer group. The relative expression of mitogen-activated protein kinase, extracellular regulated kinase messenger ribonucleic acid and protein in the colon cancer group was markedly significantly higher than that in the blank control group; the relative expression of mitogen-activated protein kinase, extracellular regulated kinase messenger ribonucleic acid and protein in the mammalian STE20 like protein kinase 1 over expression group was markedly significantly lower reduced than that in the colon cancer group. Over expression of mammalian STE20 like protein kinase 1 can block the mitogen-activated protein kinase-extracellular regulated kinase signal transduction pathway, reduce the viability of colon cancer cells, restrain the proliferation growth, migration and invasion of colon cancer cells, and induce apoptosis of colon cancer cells, thus ultimately contributing to the establishment of a theoretical foundation for the development of targeted therapies for colon cancer.

Key words: Mammalian STE20 like protein kinase 1, mitogen-activated protein kinase/extracellular signal-regulated kinase, colon cancer, migration, invasion, colon cancer

INTRODUCTION

Colon Cancer (CC) is a prevalent malignancy affecting the digestive system, specifically the colon, within the realm of clinical practice, with high morbidity and mortality[1]. As the aging population continues to grow and societal living habits undergo transformation, the incidence of CC is gradually increasing, which seriously threatens people's life and health[1]. There exists a deficiency in curative modalities for the clinical management of patients diagnosed with CC, and radiotherapy and surgical resection are mainly used. In recent years, with the progress of targeted therapy, more and more malignant tumors have been gradually treated with targeted therapy. Therefore, conducting comprehensive investigations into the pathogenesis and etiology of CC, alongside the exploration of novel therapeutic targets, holds immense clinical importance in enhancing patient's clinical manifestations, slowing down the progression of cancer, and improving patient's quality of life[2]. The Hippo pathway, which is considered to be related to the growth of tissues and organs, was firstly found in *Drosophila*, and the later study confirmed that the abnormal activity of the Hippo signaling pathway is closely associated to the occurrence and development of colorectal cancer[3]. Mammalian STE20-like Kinase 1 (MST1) is one of the core members of the Hippo pathway, which was found to play an important role in cell growth, proliferation, apoptosis, maintenance of organ size and tumorigenesis[4]. In addition, the Mitogen-Activated Protein Kinase/Extracellular Signal-Regulated Kinase (MAPK-ERK) signaling pathway is closely related to tumorigenesis and progression, which is an important pro-proliferative and anti-apoptotic pathway in cells[5]. This study aimed to examine the impact MST1 on CC invasion and metastasis through the MAPK-ERK signaling pathway, with a view to providing potential possible therapeutic targets for clinical CC treatment.

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Elective percutaneous coronary intervention and the Risk of Periprocedural Myocardial Injury: A Randomized Clinical Trial on Allopurinol's Effects

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Abstract

***Context:** A major public health concern with a high death rate is periprocedural myocardial damage (PMI) during percutaneous coronary intervention (PCI). Among the many causes of PMI, inflammation and oxidative stress rank high. Allopurinol may be beneficial for the heart because it reduces oxidative stress caused by xanthine oxidase (XO).*

***Objectives:** One hundred ten patients hospitalized for elective percutaneous coronary intervention (PCI) were the subjects of this randomized clinical experiment. Two hours before to the surgery, 55 patients were randomly randomized to either receive the normal pretreatment or a 1200 mg loading dose of allopurinol. At baseline, 8, and 24 hours after PCI, the levels of creatine kinase-MB (CK-MB) and cardiac troponin I (cTnI) were assessed in both groups. At baseline (P = 0.71), 8 hours (P = 0.26) and 24 hours (P = 0.88) after PCI, there were no statistically significant changes in the CK-MB levels between the two groups. At baseline (P = 0.26), 8 hours (P = 0.80), and 24 hours (P = 0.89) after the PCI, there were no significant changes in the cTnI levels. Neither group differed from the other on the mean CK-MB and cTnI change. In conclusion, our investigation found no evidence that allopurinol reduced enzymes particular to the heart.*

To determine allopurinol's efficacy in avoiding myocardial damage due to percutaneous coronary intervention (PCI), more research is necessary.

Introduction

Along with the progression of industrial societies and the growing burden of cardiovascular diseases, the rate of percutaneous coronary intervention (PCI) procedures is markedly increased. In this regard, PCI has a key role in occlusive coronary artery disease (CAD) management.1,2 Despite improving PCI procedures, its adverse events remain at the center of attention. Among these, periprocedural myocardial injury (PMI) is the main complication that affects patients' early and late outcomes and leads to a higher mortality rate and morbidity. As the 2018 ESC/ACCF/AHA/WHF statement on the Fourth Universal Definition of Myocardial Infarction, PMI was determined by the rise of cardiac enzymes more than the upper limit of the normal values after PCI. Based on this definition, the rate of PMI was reported to be about 15.8-30% in the studies. Several studies considered oxidative stress and inflammation as critical mechanisms involving PMI.1,3,4 Allopurinol attenuates oxidative stress by inhibiting xanthine oxidase (XO). Previously, allopurinol-related reduction in oxidative stress has been demonstrated to enhance myocardial contraction in patients with congestive heart failure (CHF).5,6 The anti-oxidant effects of allopurinol might result in improved endothelial and cardiac contractile function.7 It has also

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Effect of Aescin on Inflammatory Responses in a Diabetic Peripheral Neuropathy Rat Model by Modulating HMGB1 and RAGE Levels

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ABSTRACT

The diabetic peripheral neuropathy pain model was constructed after 95 Sprague Dawley rats had been randomly divided among blank reference and model groups. Aescin low-dose group (0.5 mg/kg), aescin medium-dose group (1.0 mg/kg), aescin high-dose group (1.5 mg/kg), and positive control group (0.25 mg/ kg mecobalamin) were then randomly assigned to the simulation group following successful modeling. At the conclusion of the study, the mean sciatic nerve conduction velocity was determined, blood glucose in addition to the amount of inflammatory factors tumor necrosis factor-alpha, interleukin-6, and interleukin-1 were determined, and sciatic nerve cells from mice in all groups were collected for Western blot to identify the protein levels of high mobility group box 1 and receptor for advanced glycation end products. The mean sciatic nerve conduction velocity of the medium and high-dose groups of aescin was higher than those of the model control ($p<0.05$); rat blood glucose content, the contents of inflammatory factors interleukin-1 beta, interleukin-6 and tumor necrosis factor-alpha as well as the protein expression of high mobility group box 1 and receptor for advanced glycation end products in sciatic nerve tissue were lower and the body mass was higher than that of the model control group ($p<0.05$). Comparing the high-dose aescin group as well as the positive control group, there had been no discernible change in the aforementioned indices ($p>0.05$). Aescin is able to effectively improve the inflammatory response in the body by regulating high mobility group box 1-receptor for advanced glycation end products levels and slow down diabetic peripheral neuropathy caused by the inflammatory response.

Key words: Glycation, aescin, diabetic peripheral neuropathy, cerebral infarction, amputation, pain

INTRODUCTION

Diabetic Peripheral Neuropathy (DPN), clinically characterized mainly by sensory and motor nerve symptoms[1], has an insidious onset and unclear pathogenesis, its early detection is relatively difficult, and by the late stage, it will cause the patient's limbs to suffer from recurrent infections, ulceration of the foot, gangrene and other serious complications, and more seriously, it will make patients have the risk of amputation and threaten human health. According to studies, the prevalence of diabetes is around 3 % in the general population, whereas its neuropathy consequences are around 60 %, which means that 50 % are DPN[2]. Highly Mobile Group Box 1 (HMGB1), a nuclear transcriptional protein associated with the inflammatory process, alongside the Receptor For Advanced Glycation End Products (RAGE), an association recognition receptor present in the immune system of the human body, have both been implicated in lung injury, nephritis, type 2 diabetes, ischemia-reperfusion injury, and a number of additional illnesses brought on by inflammatory or infectious conditions[3-5]. It has been proposed that in HMGB1 involved in body cell signal transduction, RAGE is involved as one of the receptors, and the combination of the two can activate relevant signal transduction pathways in cells to promote the body inflammatory response[6]; inflammatory reactions are brought on by the ability of HMGB1 to associate with RAGE on the outermost layer of inflammatory cells outside the cell, which encourages the production of inflammatory factors including Tumour Necrosis Factor-Alpha (TNF-α), Interleukin (IL), and IL-6, among others[7]. Aescin has anti-inflammatory and anti-tumor effects[8], and its main component, sodium aescin, can inhibit the releases of inflammatory factors and even kill cancer cells through a variety of mechanisms in turn to prevent or delay the occurrence of chronic diseases such as tumors, and aescin is clinically used alone or in combination with other drugs for anti-tumor therapy[8-10]. In addition, as a Chinese herbal extract, aescin is also commonly used clinically to treat diabetic complications such as diabetic retinopathy and diabetes with acute cerebral infarction[11-12], but the mechanism of aescin on DPN is still under investigation.

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Creating and Evaluating the Over-the-Counter Coach App to Assist Pharmacy Students in Their Education

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Abstract

This challenge is described as follows: it is intended that pharmacy students would study how condition and patient-specific variables impact pharmaceutical decision-making. Our goal in developing this interactive learning tool was to help students better understand the many personal aspects that influence the recommendations for over-the-counter (OTC) medications.

Innovation description: Student pharmacists may practice making recommendations regarding over-the-counter drugs with the help of OTC Coach. The OTC Coach, an optional resource for first-year pharmacy students taking the mandatory self-care therapeutics course, offered computerized decision algorithms covering ten different areas. The opinions of the students were gathered by means of an online survey.

Evaluate thoroughly: OTC Coach accounts were activated by two-thirds of the first-year students engaged in the self-care treatments course (n=53/79, 67%). Participants who used the tool and filled out the survey (n=60/75, 80%) agreed that it helped them understand the material (78%), felt more confident in making good therapeutic recommendations (78%), were more comfortable answering exam questions (63%), and performed better on exams (61%).

What comes next: Students self-reported that they learned more about over-the-counter medicine recommendations after using an electronic application. An ability to create a series of scenarios with randomly assigned patient and condition characteristics is being added to the application so that students may practice producing patient-centered recommendations more effectively.

Medications available without a prescription, therapeutic decision-making, student pharmacists, and simulation

Description of the Problem

As they acquire the knowledge and abilities to prescribe OTC medications, student pharmacists may refer to the Pharmacists' Patient Care Process (PPCP) for guidance.1 All the therapeutic decision-making processes are part of the PPCP, including information gathering, data appraisal, recommendation making (including weighing the pros and cons of potential treatments), and plan execution and monitoring.1- 4 While this procedure is generic and may be used in any practice environment, it lacks specific instructions on what data must be gathered and evaluated before an over-the-counter advice can be made.5 Student pharmacists must learn to offer patient-centered recommendations for over-the-counter drugs (OTCs) due to the large number of these items (300,000+) sold in the US, representing more than 80 therapeutic classes.6,7 Scientific research has shown that students may enhance their knowledge and abilities via the use of engaging virtual simulations.From 8 to 14 Typically, students in current virtual simulation programs for student pharmacists are only allowed to interact with one virtual patient at a time while learning decision-making skills.fifteen, sixteen Unfortunately, this hinders students' ability to understand how many patient and medication-related aspects impact therapy recommendations. Students might benefit from rapid decision-making exercises where they can manipulate patient and condition inputs to test out various hypotheses and determine the effects on the validity of over-the-counter medicine recommendations. We developed OTC Coach to help student pharmacists learn to make evidence-based judgments about over-the-counter treatments by providing them with a framework to systematically assess patient- and condition-related aspects. This paper's goal is to detail the process of creating the OTC Coach and how students feel about using it.

Information about the New Development

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Factors Correlating with Anti-Diabetic Medicine Beliefs in Vietnamese Outpatients with Type 2 Diabetes

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ABSTRACT

An key issue for both patients and clinicians has been poor antidiabetic drug adherence, which raises the medical burden and creates problems associated to diabetes. Partially improving patients' non-adherence status to drugs may be achieved by improving their ideas about medicine. Outpatients with type 2 diabetes at Hue University Hospital were surveyed to determine their attitudes about antidiabetic medication. The Endocrinology Clinic at Hue University Hospital recruited 396 outpatients with a diagnosis of type 2 diabetes mellitus using a simple sample approach. The research followed certain inclusion and exclusion criteria. The Beliefs about Medicines Questionnaire (BMQ-V) in Vietnamese, published by Dr. Nguyen Thang et al., served as the basis for our questionnaire that we used to interview patients. The initial step was to identify the factors that were linked with BMQ-V and subscale scores using statistical methods such as paired sample t-tests, one-way ANOVA, Kruskal-Wallis, and chi-squared. The factors were then compared using Multivariate Regression Analysis to the BMQ-V and its subscale scores. We used SPSS 20.0 to examine all of the data. The median age of the 396 individuals with type 2 diabetes who participated in the research was 66.9±13.7 years. The participants' beliefs on medicine obtained an average score of 50.3±8.1, as per the BMQ-V questionnaire. There was a statistically significant correlation between the BMQ score and HbA1c control status, duration of diabetes, and home blood glucose monitoring, as shown by multivariate regression analysis (p=0.001, p=0.003, and p<0.001). Patients with uncontrolled HbA1c levels (S-N:9.6±3.7) believed that taking antidiabetic medicines was more important than the control group (S-N:10.9±4.4), and there was a statistically significant difference in the trust that diabetic patients with longer disease duration (S-N: 9.1±3.5) had in the effects of their medications on their health compared to patients with shorter duration (S-N: 11.3±4.4). The mean scores on the Specific-Concerns, General-Overuse, and General-Harm subscales were significantly lower than those of other groups (p<0.001; p=0.003; p=0.001), suggesting that the group that monitored their blood sugar at home regularly (>2 times/week) was very worried about the potential harmful long-term effects. Consequently, to increase medication adherence and treatment efficacy, it is necessary to gradually decrease negative beliefs about medicines, educate patients about the long-term side effects of medications, encourage them to monitor their blood glucose levels at home, and encourage them to make lifestyle changes.

Antidiabetics, medication adherence, and type 2 diabetes mellitus

INTRODUCTION

Developed and emerging nations alike are grappling with the growing medical and societal impact of diabetes mellitus, a metabolic condition that affects millions of people each (ADA, 2020). The World Health Organization (WHO) lists hyperglycemia as a leading cause of early mortality, next only to hypertension and cigarette smoking (International Diabetes Federation, 2017). Patients with well-controlled diabetes are less likely to have problems, are able to continue working regularly, have a longer life expectancy, and enjoy a higher quality of life. Nevertheless, glycemic control (HbA1c < 7%) remains unmet for a minimum of 45% of individuals diagnosed with type 2 diabetes. Medication non-adherence is a defining feature (Polonsky & Henry, 2016). The topic of antidiabetic drug adherence has been investigated in a number of research, with conflicting conclusions. Researchers in the UAE, Ethiopia, and the Kingdom of Saudi Arabia found that 85% of people taking their diabetes medicine as prescribed (Abebaw et al., 2016; Alakhali, 2015; Arifulla et al., 2014; Bagonza et al., 2015). However, Aminde et al. (2019) and Huber and Reich (2016) found lower prevalence rates in Cameroon and Switzerland, with estimates ranging from 40% to 52%. This has far-reaching consequences for clinical outcomes, is expensive for contemporary healthcare systems, and is a major public health concern (Al-Temimi et al., 2021). Seuring et al. (2015), Khunti et al. (2017), and Lê ThịHương Giang & Hà Văn Như (2013) found that individuals with diabetes incur unnecessary healthcare expenses and suffer irreparable harm owing to non-adherence to treatment. Treatment adherence is already an issue, and efforts to explain and improve it are

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An Investigation of the Initial Phytochemical and Diuretic Properties of Thespia Populea Bark

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ABSTRACT

Thespesia populnea, more often known as the Indian tulip tree, is a well-respected evergreen tree of the malvaceae family. The plant may be found in coastal forests and tropical parts of India. Traditional medicine makes extensive use of it, and it is well-known for all of its components. The plant's properties include astringency, antibacterial activity, hepatoprotective effects, hemostatic properties, anti-diarrheal properties, and anti-inflammatory ones. Thespesia populnea bark powder, which had been shade dried, was extracted many times using several solvents, including water, chloroform, alcohol, and pet ether. In albino rats, we tested a number of bark extracts for their diuretic properties. The study's parameters included urine volume and the concentration of Na+, K+, and Cl-ions in the urine. As a reference, furosemide (100 mg/kg) was used. Urine volume and concentrations of Na+, K+, and Cl-were all significantly increased by the extract (400 mg/kg). Polyphenolic substances, carbohydrates, proteins, and natriuretic and diuretic properties were all found in the extract, according to the current research.

INTRODUCTION:

Thespesia populnea soland ex correa (family malvaceae) is a large tree found in the tropical regions and coastal forests in India and cultivated in the gardens. All the parts of the plant used in traditional system of medicine. The bark, leaves, flower and fruits are useful in cutaneous infection such as scabies, psoriasis, eczema, ringworm, and guinea worm. The decoction of the bark was commonly used for the treatment of skin and liver diseases. A compound oil of bark and capsules is useful in urethritits and gonorrhe1. The bark, root, fruits were used in dysentery, cholera and hemorrhoids. The fruits of the plant are used in Ayurveda for the control of diabetes2. The barks and flowers posses astringent, hepatoprotective, antioxidant and anti-inflammatory activities in rats3, 4, 5. The leaves and bark of this tree are still used to produce oil for the treatment of fracture wounds and as an anti-inflammatory poultice applied to ulcers and boils, as a folk medicine6. Gossypol was found to be the major component of *Thespesia populnea* producing anti-fertility effects in rats 7, 8, 9 as well as in human beings10. Four naturally occurring quinones viz thespone, thespesone, mansonone-D, and mansonone-H have been extracted from heart wood of the plant11.

The phytochemical study reveals the presence of carbohydrate, protein, tannins, phenol, flavonoids, terpenes, saponins and gums in the ethanolic extract of the bark12. In siddha system of medicine the plant bark has described to be used to reduce the swelling and in oedema of abdomin. So from this present study it may be conclude that the ethanolic extract posses a significant diuretic activity. The present study thus attempts to evaluate the bark and leaf of traditional medicinal plant *Thespesia populnea* (fam: malvaceae) which includes: (a). To perform a pharmacognostical study, this is useful to evaluate the quality, purity and standard of the plant material.To isolate a possible new phytoconstituents, may verify their validity with their folklore claims. (b). To characterize the phytoconstituents and analyze by various instrumental methods.

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A Review of Medicinal Plants Acting as Anti-Ulcer and Hepatoprotective Agents

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ABSTRACT:

Nature provides a plethora of medicinal substances and may hold the key to curing all human ailments. Many effective pharmaceuticals have their origins in natural sources. Liver and ulcer illnesses are on the rise in terms of severity. Several medications are available today for the treatment of hepatic disorders and peptic ulcers; however, these therapies come with a variety of adverse effects, including the possibility of drug interactions and relapses. Medications derived from plants are becoming more popular for the treatment of hepatotoxicity and peptic ulcers. Finding pure phytochemicals that can protect the liver and fight ulcers is a challenging task. It costs a lot of money and takes a long time. There are no medicinal plants used to cure ulcers and liver problems, according to reliable literature sources. Due to their effective action against certain hepatotoxins, plants such as Andrographis paniculata, Eclipta alba, Picrorrhiza kurroa, Silibum marianum, Phyllanthus, Trichopus zeylanicus, etc. are shunned. The most significant of the several substances exhibiting anti-ulcer and hepatoprotective effects are flavonoids. One of flavonoids' key functions is to lower levels of free radicals. The hepatoprotective and anti-ulcer effects of some isolated chemicals, such as apigenin, sylimarin, genistein, quercetin, kaempherol, catechins, and many more, are striking. We may infer from this review paper that the anti-ulcer and hepatoprotective effects are due to the active chemical constituents of a number of medicinal plants. Flavonoids are a significant part of the chemical makeup.

INTRODUCTION:

These days, significant health issues including peptic ulcers and liver illnesses are common. The liver is responsible for storing, secreting, and regulating metabolic processes in the body. 1. Approximately 15,000 people die each year from peptic ulcers and 20,000 people die from liver problems combined. The most prevalent kind is hepatocellular carcinoma. The lipid that causes damage to liver cells is formed by a covalent connection between certain reactive species and hepatotoxic substances (2, 3). 4. A most common kind of ulcer is an inflamed opening in the lining of the digestive system, either the skin or the mucous membrane. Peptic ulcers are primarily produced by an imbalance in acid secretion and normal mucosal resistance, which may be aggressive or diminished. Additional factors that might lead to peptic ulcers include a bacterial infection (H. pylori), chronic pain medication usage (ibuprofen, naproxen sodium, etc.), emotional stress, and a diet high in spicy foods. 5. Ulcers in the stomach and duodenum may develop when hydrochloric acid and pepsin damage the lining of the digestive system. Nearly all ulcers have a diameter of 3 mm to a few centimeters. 6. Men have a higher incidence of duodenal ulcers than females. Both middle-class and elderly persons are prone to gastric ulcers. Ulcers of the stomach develop in the stomach's acidic secretions, which are often more 7. The biggest organ in a human body is the liver. The liver's primary function is to regulate metabolic processes, including those involving carbohydrates, lipids, and proteins. In addition to its significance in vitamin storage and bile acid production (both of which are vital for digesting), it is involved in detoxification. Preserving a healthy liver, therefore, is of paramount importance for human health. Because of these roles, hepatic infections pose the greatest risk to public health, and hepatitis is a common disease today. Liver disorders may have several causes. They might look like this: eleven, twelve, thirteen.

1. An excessive amount of dangerous chemical compounds.

2. Hepatic cell damage, cirrhosis, jaundice, and fatty liver are all symptoms of an overabundance of free radicals, which also impede the body's natural defense mechanism.

3. Rapid lipid deposition precedes the appearance of necrosis in cases of intense carbon tetrachloride damage.

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Methods of Dry and Wet Grinding for Nimodipine-HPMC Nanoparticles: Impact on Physical and Chemical Characteristics, Solubility, and Rate of Dissolution

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ABSTRACT

Although it primarily affects the blood arteries in the brain, the dihydropyridine calcium channel blocker nimodipine has many of the same basic characteristics as nifedipine. Nimodipine has a low solubility and a high permeability, making it a medication belonging to class II of the Biopharmaceutical Classification System (BCS). The purpose of this research was to compare the physicochemical characteristics, solubility, and dissolving rate of nimodipine nanoparticles made using the dry and wet grinding techniques, as well as any changes in the yield between the two. In addition, the nanoparticles were made utilizing two separate procedures with a nimodipine:HPMC ratio of 1:0.6. Additionally, X-ray diffraction (XRD), Fourier transform infrared (FT-IR), scanning electron microscopy (SEM), differential scanning calorimetry (DSC), and particle size analyzers (PSAs) were used for sample characterisation. Furthermore, phosphate buffer pH 7.2 was used for the dissolving rate test, and CO2-free distilled water was used for the solubility test. The following values were determined for the solubility of nimodipine: 0.339 µg/mL for pure nimodipine in CO2-free distilled water, 1.948 µg/mL for the physical mixture, 3.367 µg/mL for dry grinding nanoparticles, and 19.952 µg/mL for wet grinding nanoparticles. The findings of the dissolving tests also showed that after 60 minutes, the physical combination dissolved 33.942 percent, the dry grinding nanoparticles 49.79 percent, and the wet grinding nanoparticles 56.484 percent of the nimodipine. Researchers found that adding nimodipine-HPMC nanoparticles to the drug made it far more soluble and enhanced its rate of dissolution.

Nicodipine, High-Performance Microcapsule, Solubility, and Rate of Dissolution

INTRODUCTION

Similar to nifedipine, nimodipine is a calcium channel blocker that acts mainly on the arteries in the brain. Treatment of cerebrovascular diseases, including ischemic neurological impairments after aneurysmal subarachnoid hemorrhage, is the primary goal of nimodipine (Sweetman, 2009). Nimodipine has a low solubility and a high permeability, making it a medication belonging to class II of the Biopharmaceutical Classification System (BCS). Because of their poor bioavailability, medications in this class also tend to have a slow rate of dissolution. One way to improve the bioavailability of this class II drug is to make it more soluble and dissolve it faster (Gohil, 2014). Methods such as adjusting the pH and forming salts, using polymorphs, cocrystals, cosolvents, surfactants, cyclodextrins, amorphous solid dispersions, particle size adsorption, and lipid-based formulations are among those that may be used to enhance the solubility of drugs (Williams et al., 2013). Alhagiesa and Ghareeb were among the several researchers that studied nimodipine in 2021. An anti-solvent approach was used to create nanoparticles in their study. It was found that the solubility of nimodipine in the nanoparticles was twenty-four times higher. Furthermore, the dissolution test showed that micronized nimodipine was 5.22 times more soluble and had a faster rate of dissolution than nimodipine alone (Zu et al., 2014).

Nanoparticles, which are particles with a size ranging from 1 to 1000 nm, are designed to enhance the bioavailability of drugs, modify drug delivery systems to target specific areas, improve macromolecular compound absorption, and decrease the gastrointestinal tract irritation caused by active substances (Mohanraj & Chen, 2006). In addition, wet grinding and dry grinding are two equally effective ways for reducing particle size while preparing nanoparticles. Nanoparticle preparation also requires a polymer that can transport drugs to precise sites (George et al., 2019). In the field of pharmaceutical technology, dry grinding is a common and easy approach. Tozuka et al. (2011) noted that medicinal products are often ground using this dry grinding process. According to Tawakoli et al. (2007), dry grinding is also favored from an ecological and economic standpoint. The medication and excipient engage via hydrogen bonds or van der Waals forces driven by mechanical energy provided during this dry grinding process. According to Hui et al. (2014), the composite particles made of drug and excipients are generally stable, don't clump easily, and keep their activation. The pharmaceutical sector often employs the wet grinding process for nanocrystal manufacturing due to its simplicity, speed, ability to lower production costs, and continuous or intermittent operation (batch mode or re-

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G.Thanusha *et. al* International Journal of Pharmacetical Sciences Letters

Problems with Warfarin Anticoagulation Control: An In-Depth Analysis and a Holistic Strategy

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ABSTRACT

The oral anticoagulant most often administered in Indonesia is warfarin. Nevertheless, TTR is consistently low among nations throughout the globe. The purpose of this research was to examine the obstacles to optimum warfarin control. There were two separate phases of the study. A prospective observational research was conducted in the first stage to examine factors such as anticoagulation control, dosage consistency, compliance with INR monitoring, medication adherence, and awareness of warfarin. In the meanwhile, solutions to the problems were proposed in the second stage via focus groups. Based on the findings, the mean TTR was 49.4 ± 32.1, with only 37.5% of patients achieving values of 65% or above. On average, 62.33 ± 32.42% of the doses were consistently administered. A one-month delay between dosage adjustments was necessary for most individuals with supratherapeutic INR levels. Further investigation revealed that only 43.8% of patients were deemed to be adherent, and only 39.5% had excellent understanding of warfarin. This indicates that the degree of drug adherence and knowledge was subpar. In around 14.6 percent of patients, other medications were prescribed that may have interacted with warfarin and caused INR variations. Findings from this research point to a number of obstacles that patients have while trying to achieve optimum warfarin management, such as difficulties with dosage consistency, monitoring INR, taking medications as prescribed, and understanding the medicine and its interactions. A comprehensive strategy integrating several tactics to overcome each obstacle is the recommended course of action.

Keywords: warfarin, problems, low TTR, comprehensive methods

INTRODUCTION

Warfarin is the most commonly prescribed anticoagulant for preventing stroke in patients with valvular and non-valvular atrial fibrillation (AF), heart valve disease, prosthetic heart valves, deep vein thrombosis, and other coagulation disorders (Nishimura et al., 2017). Despite the discovery of *Novel Oral Anticoagulants* (NOACs) with more predictable pharmacokinetic and pharmacodynamic properties, the *American Heart Association* (AHA)/*American College of Cardiology* (ACC) only recommends warfarin for patients with prosthetic heart valves, moderate to severe mitral stenosis, and valvular AF due to its proven safety and effectiveness (January et al., 2014; Nishimura et al., 2017). Furthermore, the substantial cost associated with NOACs has resulted in a majority of patients with non-valvular AF still relying on the use of warfarin. In Indonesia, the anticoagulant is presently the sole oral medication included in the national formulary for preventing

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Students' and Pharmacists' Approaches to Virtual Experiential Patient Care Practicum's

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Abstract

Background: Students enrolled in the University of British Columbia's (UBC) Pharmacy program have the opportunity to get practical experience in a primary care practice setting at the University of British Columbia's (the Clinic), which is run by pharmacists. In light of the extraordinary circumstances surrounding the COVID-19 pandemic, certain pharmacy practice sites have made the irreversible decision to move some experiential education activities online. Teaching methods that help pupils succeed in a digital setting are not well-documented at the present time. Our goal is to gather insights from student pharmacists and practice instructors on what makes a virtual patient care practicum experience work well in a university clinic.

Methods: In order to understand the viewpoints of practice educators and student pharmacists, the former of whom had no prior experience with virtual practicums and the latter of whom had some, a qualitative research approach was used. We used a semi-structured technique to conduct separate focus groups with participants, asking them questions designed to elicit their thoughts and feelings about virtual practicums. With the participants' permission, we audio recorded and transcribed the focus group meetings. The data was analyzed using a thematic analysis.

Findings: Each focus group included three participants: one practice educator for pharmacists and one student pharmacist. Based on the data, six main themes emerged: (1) optimizing technology, (2) activities connected to patient care, (3) the interaction between student and practice instructor, (4) the development of student skills, (5) student support, and (6) preferences for in-person versus virtual practicum. Setting communication norms, organizing interesting learning opportunities, and having a dependable internet connection are some of the techniques that have been suggested to address the constraints of virtual practicums. Participants' insights on what makes a virtual patient care practicum work were the basis for the study's conclusion. This study's findings may inform how other branches of medicine handled virtual clinical rotations during and after the COVID-19 outbreak.

Topics covered include preceptorship, education, practicum, and pharmacy.

BACKGROUND

The World Health Organization (WHO) proclaimed the COVID-19 pandemic in March 2020.1 As a result, healthcare and education delivery systems underwent changes. There was less literature on virtual site visits or telehealth training for student nurse practitioners or pharmacy learners before to the pandemic, and much less on virtual experiential education or precepting.2, 3, 4. During the pandemic, there were changes in pharmacy experiential education as both students and teachers of pharmacy practice adapted to online learning.5, 6, and 7 There is a dearth of resources for educators looking to improve their methods of instruction for use in online classrooms. One place where students may get real-world experience in primary care teams is at the University of British Columbia (UBC) Pharmacists Clinic, also known as the Clinic. Final year The Clinic is where Pharm.D. students who are entering the practice do their four- to eight-week clinical education practicums in direct patient care. Pharmacists on staff at the Clinic serve as practice instructors. Comprehensive medication management services are available at the clinic by appointment only. These services include education for patients, treatment of chronic diseases, and communication of pharmaceutical care plans with primary care physicians. Practice educators oversee clinical rotations at the Clinic, where students get experience in areas like as patient care appointment management, journal club facilitation, medication information requests, and case presentation skills. Although most consultations was place in person before the epidemic, patients and providers alike might choose to meet

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Revised Taxonomy and Clinical Significance of the Phlomoides Genus: An In-Depth Analysis

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Abstract

This plant, Phlomoides (L.) Moench, is a Lamiaceae member. Taxonomy for this genus has changed drastically in recent years, with several species formerly placed in Eremostachys and Phlomis now considered to be part of it. Morphological and phytochemical systematics were used to study the aforementioned species. When comparing Phlomis species to those of Phlomoides, look for the nutlet and thickly beard the top corolla lip. But morphologically speaking, Phlomoides and Eremostachys are quite similar. According to plant chemosystematics, the most common components of Phlomoides species are iridoids, phenylethanoids, and furanolabdanes. Researchers are intrigued by these plants because to their long-term traditional applications, which include treating bone fractures, providing local analgesic effects, and aiding in wound healing. In vitro, in vivo, and clinical investigations have linked the species and its secondary metabolites to potential anti-inflammatory and bone-developmental drugs. The present research presents a taxonomic status evaluation of the Phlomoides genus based on morphological and phytochemical traits, as well as its therapeutic value, in order to provide the groundwork for future studies.

Introduction

For millenniums, plants have been used as food and medicine. Today, plants are substantial sources of drugs as well as traditional medicine. Plant secondary metabolites are used originally or as lead compounds in pharmaceutical research and industries.-Hundreds of examples indicate the importance of natural sources in drug development. For instance, artemisinin, which plays a fundamental role in malaria treatment, is derived from the Artemisia genus. Paclitaxel, obtained from *Taxus brevifolia*, is a crucial anti-cancer agent.1 This valuable, ages-long experience of medicinal plant application is an opportunity that leads to a low incidence of side effects. However, using herbal materials could be expensive and harmful to the environment. Indiscriminate and unprincipled harvesting endangers natural resources. Following the idenification and isolation of active ingredients, synthetic and semisynthetic methods are studied to develop an efficient industrial production of desired components. Therefore, screening flora for novel compounds remains an attractive topic in

pharmaceutical research to discover effective medications against various diseases.2

The Lamiaceae or Mint family of angiosperms is a prominent example of a medicinal and nutritional plant source. For example, peppermint (*Mentha* × *Piperita* L.), a representative of this family, is usually prescribed for gastrointestinal disorders such as irritable bowel syndrome (IBS) and is also used as a food ingredient.3 The mint family contains 245 genera and 7886 species. *Phlomoides* (L.) Moench, comprising 168 accepted species, is one of the largest genera of the Lamiaceae family. This genus was recently revised by adding some *Phlomis* and *Eremostachys* species.4,5 From a phytochemical viewpoint, iridoids, phenylethanoids, flavonoids, and several other compounds have been isolated from this genus. *Phlomoides* species have a relatively low essential oil yield, from 0.02% to 0.9%. Non-terpene hydrocarbons such as alcohols and aldehydes are the major components of volatile oil.6,7 The reported pharmacological effects of various *Phlomoides* species include menopausal symptoms relief, anti-inflammatory activity, and anti-osteoporosis activity. Concerning the anti-osteoporosis activity, loganin and morroniside (iridoid glycosides) can stimulate the differentiation of osteoblasts through diverse mechanisms such as increasing collagen type I and inhibiting their apoptosis through anti-inflammatory effects. An *in vivo* study on ovariectomized female mice revealed the osteogenic effect of *P. umbrosa*. Increasing mineralization ratio and bone mineral density are two of the attributed

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The lipid profile of individuals with type 2 diabetes mellitus and the effects of metformin and metformin-sulfonylurea: a cross-sectional study

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ABSTRACT

Background and Aims: Metformin decreases blood glucose levels and improves the lipid profile via influencing the liver's gluconeogenesis and lipogenesis processes. On the other hand, sulfonylurea may contribute to an already elevated risk of cardiovascular disease by making lipid profiles worse. Given the widespread use of metformin and sulfonylurea in Indonesia, we are interested in learning if these two medications significantly alter the lipid profiles of patients with type 2 diabetes mellitus.

Methods: The 88 individuals with type 2 diabetes mellitus who were required to take metformin or metformin-sulfonylurea for at least a year were the subjects of a cross-sectional research. Fasting for at least 8 hours prior to blood sample was requested of those taking metformin (n=37) or metformin-sulfonylurea (n=51). Using a conventional enzymatic approach, we evaluated the lipid characteristics from blood samples of the individuals.

Findings: The two groups of participants were identical with respect to all baseline parameters. Although there was no statistically significant difference between the metformin and metforminsulfonylurea groups, we did find that total cholesterol, LDL-cholesterol, and triglyceride levels were lower in the metformin group and HDL-cholesterol levels were higher ($p>0.05$). Neither treatment differed significantly from the other in any parameter of the multivariate analysis, both before and after confounder adjustment. Only a rise in body mass index substantially accounted for the observed rise in triglyceride levels.

The results show that after using metformin or a combination of metformin and sulfonylurea for at least a year, there are no statistically significant changes in lipid profiles.

Metaformin, sulfonylurea, and lipid profile are terms related to diabetes mellitus.

INTRODUCTION

In humans, diabetes mellitus develops when the endocrine system is disturbed, leading to abnormal blood glucose levels and subsequent organ system problems (WHO, 2021). Insulin resistance and obesity are common in type 2 diabetes mellitus patients, which may lead to metabolic syndrome and poor lipid metabolism (Jaiswal et al., 2014; Schofield, Liu, Rao-Balakrishna, Malik, & Soran, 2016).

Numerous complications, such as cardiovascular illnesses, may develop in individuals with type 2 diabetes mellitus due to hyperlipidemia (Bangert, 2008; Chapman, et al., 2011). In order to address the issue of type 2 diabetes mellitus, the ADA and EASD collaborated to create a standardized protocol for the administration of antidiabetic medicine (Davies et al., 2018). The oral antidiabetic medication metformin is still the first-line treatment in this suggested strategy. According to the American Diabetes Association (ADA), the European Association for the Study of Diabetes (EASD), and the Indonesian Endocrinologist Association (PERKENI), the second step in managing patients with type 2 diabetes is the combination of sulfonylurea and metformin (Adler, Shaw, Stokes, & Ruiz, 2009; PERKENI, 2015). It is necessary to assess their efficacy to reduce blood glucose levels and to avoid the advancement of comorbidities as many patients are given both drugs (Davies et al., 2018). Worldwide, 60% of people with type 2 diabetes use metformin because it has a reduced risk of side effects compared to other oral

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K.Anand kumar et. al International Journal of Pharmaceutical Sciences Letters

A Small, Single-Center Community Hospital's Approach to Antimicrobial Stewardship in the Treatment of Patients with Escherichia coli Bacteremia

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Abstract

Purpose: Inaccurate findings from antimicrobial susceptibility testing (AST), high expenses, and a lack of funding are just a few of the problems that pharmacist-led antimicrobial stewardship initiatives might face. In particular, resistance to gram-negative pathogens has grown since the COVID-19 pandemic. The majority of infections in a little community hospital with only one center are gram negative, with Escherichia coli infections being the most common. Consequently, the purpose of this research is to examine the pandemic's effects on antimicrobial stewardship initiatives aimed at fighting Escherichia coli and other ESBL pathogens, as well as the burden of gram-negative bacteremia.

Methods: Patients from a local community hospital who were 18 years old or older were examined in a retrospective cohort study. If patients' blood cultures did not show a positive result for Escherichia coli and antibiotics were not started while they were in the hospital, they were not included in the study. Determining the duration of hospital stay was the main goal. Antibiotic de-escalations, antibiotic duration, time to final antibiotic treatment, serum procalcitonin levels, blood culture availabilities, MIC breakpoints, and Clostridioides difficult occurrences are critical secondary outcomes. Among the seventy-four individuals diagnosed with gram-negative bacteremia, 41 tested positive for Escherichia coli. The duration of stay for patients with Escherichia coli bacteremia who remained in the intensive care unit was 13.6 days, according to the primary endpoint statistics. The average duration of stay for patients with bacteremia caused by Escherichia coli in a non-intensive care unit context is 7.3 days, whereas the length of stay for patients with bacteremia caused by E. septic shock in the same situation is 6.8 days.

Results: Antimicrobial stewardship programs (ASPs) in small community hospitals confront a number of obstacles; nonetheless, this particular ASP is making good use of its policies and resources to reduce hospital stays for patients with Escherichia coli bacteremia and increase the use of appropriate antibiotics.

Coli form bacterium, COVID-19, bloodstream infection, procalcitonin, and the Antimicrobial Stewardship Program are some of the related terms.

Introduction

The goal of Antimicrobial Stewardship Programs (ASP) is to reduce antibiotic resistance and the overuse of antibiotics. Acute care hospitals in the United States give antibiotics, and over 30% of those medications are either not needed or are not effective. The Antibiotic Stewardship Program (Core Elements) was introduced in 2014 by the Centers for Disease Control and Prevention (CDC) and is now being used in hospitals nationwide. Updates to the Core Elements include additional sections on hospital leadership's dedication, pharmacy knowledge and experience, taking

action, monitoring progress, reporting findings, and education.4 From 2015 to 2020, the proportion of hospitals using ASP rose from 48% to 91%.5 Along with the fight against COVID-19, Antimicrobial Stewardship Programs became an essential component of healthcare systems nationwide in 2020 and 2022. In light of the apparent link between the COVID-19 pandemic and the subsequent increase in antibiotic resistance, it was necessary to investigate regional patterns in community hospitals more thoroughly. A rise in healthcare-associated infections, an uptick in the use of antibiotics, and problems with enforcing infection control measures are all outcomes of the COVID-19 pandemic. Hospitals have been seeing sicker patients with longer lengths of stay because to the pandemic, which has led to the development of more resistant illnesses. This is especially true in hospitals, where the prevalence of enterobacterales that produce extended spectrum beta-lactamase (ESBL) has surged by 32% between 2019 and 2020.1 The majority of gram-negative bacterial infections in hospitals are caused by Escherichia coli, and gram-negative bloodstream infections are a leading cause of death and disability.2 Although the Infectious Disease Society of America (IDSA) discusses gram-negative infection

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Shilpadas *et. al* International Journal of Pharmacetical Sciences Letters

The association between oxidative stress markers and thiol/disulfide homeostasis in Turkish women who are not diabetic, at risk for diabetes, or have type 2 diabetes

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ABSTRACT

Context and Objectives: Diabetes is one of the disorders characterized by a breakdown of thiol/disulfide homeostasis (TDH).

The purpose of this research was to look at those who have type 2 diabetes, those who are prediabetic, and those who have just been diagnosed with blood sugar levels to see how TDH relates to oxidative stress markers.

Methods: Our research included 26 women who did not have diabetes, 24 women who were prediabetic, and 19 women who had type 2 diabetes. Tests for type 2 diabetes mellitus were requested by all of them at the Diabetes Polyclinic at Zonguldak Bulent Ecevit University's Health Practice and Research Center, Endocrinology and Metabolism Diseases. The patient's medical records were combed through for demographic and laboratory information. In order to study oxidative stress parameters and dynamic total DH, ELISA kits were used.

Compared to non-diabetics, type 2 diabetics had considerably higher total oxidant status (TOS), total thiol, and disulphide levels (24.24±14.93 vs 14.14±12.19, 646.47±75.51 versus 470.88±180.85, and 179.32±51.24 versus 91.85±40.29, respectively). There was a significant positive connection (P=0.000) between TOS and levels of native thiol, total thiol, and disulphide in type 2 diabetics. A strong positive association was seen in prediabetics between total antioxidant capacity and total thiol levels ($P<0.05$), as well as between arylesterase and both native and total thiol levels ($P<0.05$). However, no such association was detected for total antioxidant capacity.

In conclusion, type 2 diabetics may have symptoms associated with elevated blood glucose levels due to an increase in oxidative stress and a decline in TDH.

Topics covered include sulfhydryl compounds, type 2 diabetes mellitus, prediabetes, and oxidative stress.

INTRODUCTION

Hyperglycemia, caused by inadequate insulin oscillations, is a hallmark of type 2 diabetes mellitus (T2DM). Its frequency is growing daily. The World Health Organization estimated 422 million people as having diabetes in 2020, with 1.6 million people losing their lives to the disease annually (Lovic et al., 2020). It is well-established that metabolic syndromes may develop in the absence of a definitive diagnosis of type 2 diabetes due to inadequate insulin production by pancreatic beta cells. When blood sugar levels are elevated but no other diabetic symptoms have shown, this condition is known as prediabetes. According to Khetan and Rajagopalan (2018) and Garber et al. (2019), prediabetes is therefore seen as a precursor to type 2 diabetes.

The production of more free radicals, which are very reactive substances, might harm cells. To counteract free radical damage, the body employs an antioxidant defense mechanism. When there is a disruption in the balance between declining levels of antioxidants and free radicals (Sies, 1997). Thiol groups (-SH) are able to create disulphide (RSSR) bonds when exposed to reactive oxygen species. This process can be undone (Erel & Neselioglu, 2014). The cysteine residue in glutathione (GSH) causes it to be oxidized to glutathione disulfide (GSSG) under OS

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Dr.Narasaiah *et. al* International Journal of Pharmacetical Sciences Letters

THE ANTI-Spasmodic AND ANThelmintic Effects of NYCTANTHES ARBORTRISTIS LINN.

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ABSTRACT

Using a guinea pig ileum preparation against acetylcholine, the antispasmodic activity of several ethanolic extracts of Nyctanthes arbortristis Linn. was assessed. We used earthworms (Pheretima posthuma) to test for anthelmintic activity, as reported by Kailashraj and Kurup. While the extracts did show some antispasmodic efficacy, it was not nearly as strong as piperazine citrate. The worms were killed by the plant's seeds and blooms, and its ethanolic extracts exhibited concentration-dependent paralytic action. Additionally, it was noted that the presence of atropine intensified the paralytic and fatal effects of the corresponding ethanolic extracts. It demonstrates that the extracts' anthelmintic impact is a result of their ability to suppress motility by reducing sensitivity to the contractile action of acetylcholine.

INTRODUCTION:

Nyctanthes arbortristis Linn. (Fam. Oleaceae), commonly known as Harsingar or Night Jasmine, is a common wild hardy large shrub or small tree. It is a native of India, distributed wild in sub-Himalayan regions and southwards to Godavari. It is also found in Indian gardens for ornamental purposes1-2. Its different parts are known to possess different pharmacological activities in Indian systems of medicines. Several phytochemical and pharmacological investigations have also been done on this plant4-12. The antispasmodic4 and anthelmintic1-3 activities of the leaves of *Nyctanthes arbortristis* L have been reported. The present study is carried out with the ethanolic extracts of its different parts like flowers, barks, seeds and leaves to study and confirm its anthelmintic activity.

MATERIALS AND METHODS:

Plant material: The flowers, barks, seeds and leaves of *Nyctanthes arbortristis* L. were collected from the gardens and forests of Orissa. The herbarium of the plant (CNH/I-I(20)/2005-Tech-II/254) was authenticated as *Nyctanthes arbortristis* (Fam.Oleaceae) from Botanical Survey of India, Kolkata. The dried leaves, barks and seeds were powdered coarsely and than were extracted successively with petroleum ether, chloroform and ethanol (90%) in soxhlet apparatus10-12. Its fresh flowers were extracted with ethanol (50%)10-11. The ethanolic extracts of leaves, barks, seeds and flowers were evaporated to dryness to get dark gummy masses, having yield value 14%, 12.5%, 26.5% and 13% respectively. The water soluble-portions of the extracts were subjected to further pharmacological screening.

Animals: Guinea pig weighing 400-600 g was obtained from the animal house of B.I.T., Mesra, Ranchi. It was kept under controlled environmental conditions allowing free access to food and water and acclimatized for at least a week before the commencement of the experiment. The Institutional Animals Ethics Committee (Registration No. 62/02/ac/CPCSEA) approved the experiments.

Antispasmodic activity: The antispasmodic activity was estimated using guinea pig ileum preparation against acetylcholine, used as the spasmodic agent13-14. Effect of the isolated compound on the concentration response curve of acetylcholine was observed. Then keeping the concentration of acetylcholine constant in the bath solution, responses were observed with the increasing concentrations of arbortristoside-A to estimate the amount, required to block the contraction that was produced by acetylcholine.

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R.Mounika *et. al* International Journal of Pharmacetical Sciences Letters

SYNTHESIS OF PHENYL HYDRAZINE SUBSTITUTED BENZIMIDAZOLE DERIVATIVES AND THEIR BIOLOGICAL ACTIVITY

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ABSTRACT:

2-Chloromethyl benzimdazole is formed by condensation of o-phenylene diamine with chloroacetic acid. It is then subjected to halide substitution with phenylhydrazines to get the matching NN' disubstituted hydrazines. In vitro anti-inflammatory activity and microbiological screening were performed on the produced compounds.

INTRODUCTION:

Benzimidazole derivatives are an important class of nitrogen containing heterocycles and were reported to possess a wide spectrum of biological properties such as antibacterial, analgesic, anti-inflammatory, antifungal and antimalarial activities. Although a number of drugs are available in the market, thirst for discovering new antimicrobial drugs with better pharmacokinetic profile, and lesser toxicity has become main objectives in the field of medicinal chemistry due to fast development of microbial resistance towards the existing molecules. Despite a number of drugs being in clinical use, search for new NSAIDS is still relevant because the existing molecules suffer from the drawback of adverse effects such as gastric ulceration, inhibition of platelet function, alterations in the renal function, hypersensitivity reactions etc.

RESULTS AND DISCUSSION:

Chemistry: 2- Chloro-methyl benz-imidazoles were prepared by Condensation of O-phenylene diamines with Chloroacetic acid. 2- [(2-phenyl-hydrazinyl) methyl] - 1H- benz-imidazole were prepared by the halide replacement of substituted 2- chloro-methyl benz-imidazole with Phenyl hydrazinyl ring.

Antimicrobial activity:

a) Antibacterial activity:

The antibacterial activity of newly synthesized benzimidazole derivatives has been evaluated against Gram positive *Staphylococcus aureus and Enterobacter cocci and Gram negative Escherichia coli* and *Shigella* species by disc diffusion method. The standards used are Norfloxacin and Gatifloxacin. The antibacterial data is given in the table- 1. b)

Antifungal activity: *Aspergillus niger and Aspergillus flavus:* The antifungal activity of newly synthesized benzimidazole derivatives have been evaluated against *Aspergillus niger and Aspergillus flavus* the standard used is Clotrimazole and Amphotericin B. The antifungal data is given in the table- 2.

CONCLUSION:

The observation of other compounds revealed that the substitution of 6-nitro group in benzimidazole ring increases the antibacterial activity. All compounds have shown antibacterial activity against Gram positive bacteria as well as gram negative bacteria namely *Staphylococcus aureus, Enterococci* and *Escherichia coli Shigella (Gram negative).* The 6-nitro derivative of benzimidazole shows good activity against *Aspergillus niger* and *Aspergillus flavus*..

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Mercy florence *et. al* International Journal of Pharmacetical Sciences Letters

The Cytotoxic Effects of Surfactant-Mediated Noble Metal Nanoparticle Synthesis on Breast Cancer Cells

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ABSTRACT

The biomedical applications of the noble metal nanoparticles have been the field of interest, especially in cancer therapy. In this paper, the synthesis of spherical silver and gold nanoparticles and their apoptotic activity against breast cancer cells is reported. The chemicals reduction method is used to synthesize nanoparticles. Two different types of surfactants i.e., citrate and polyvinylpyrrolidone were used as a reducing and capping agent. The synthesized nanoparticles have been characterized using X-ray diffraction, ultraviolet-visible absorption spectroscopy, dynamic light scattering, zeta potential and transmission electron microscopy. The synthesized nanoparticles have crystalline phase with average size in the range of 25-30 nm and possess negative surface charge. In vitro studies of nanoparticles against breast cancer cells (MCF-7), were performed. The results show the significant cytotoxicity of nanoparticles against the cancer cell line and found to be mediated by DNA damage.

Key words: Breast cancer cell line (MCF-7), deoxyribonucleic acid damage, metal nanoparticles, poly vinyl pyrrolidone, silver nanoparticles, trisodium citrate

INTRODUCTION

As the leading killer on a global scale, cancer affects people's financial stability, quality of life, and access to healthcare. Anticancer drugs such vinblastine, doxorubicin, taxol, and cisplatin, among others, are more effectively delivered to all disease sites, including micro metastatic lesions, during chemotherapy compared to radiation and surgery [1,2]. Systematic administration of cytotoxic medicines during chemotherapy is now plagued by two main difficulties. Two factors must be considered: first, the dosage-limiting toxicity to healthy tissues, and second, the patient's innate or acquired multidrug resistance. Nanomaterials have recently gained a lot of attention for their possible utility in medicine, both in diagnosis and treatment [3-5]. The possibility to deliberately alter the physico-chemical and biological properties of silver and gold nanoparticles, as well as recent breakthroughs in synthesis, have created new possibilities for nano-medicine applications [6,7]. Important variables include the reactants, pH, temperature, mixing order, presence of

electrophilic and nucleophilic reagents, stabilizer type, and rate of reducing agent addition in the experiment [8–10]. These factors impact the physicochemical characteristics, color, stability, shape, and size of nanoparticles made of advanced nanomaterials [11]. Natural and synthetic ligands or polymers are often used as protective or capping agents to avoid aggregation during the synthesis and production of metal nanoparticles [12,13]. Because the nature of the reducing agent affects the size, shape, and distribution of particle sizes, selecting an appropriate reducing agent is also crucial. The metal precursor is decreased when a reducing agent is introduced [14].

The exceptional characteristics of metal nanoparticles from noble metals like silver and gold, including surface enhanced Raman scattering, high conductivity, catalysis, and antibacterial effect, as well as their uses in electronics, bio-labeling, and catalysis, have attracted a great deal of research attention [15–18]. Noble nanomaterials exhibit strong optical field increases due to the resonant oscillation of their free electrons when exposed to light. Optics, imaging, sensing, cosmetics, cancer treatment, and medicine delivery are just a few of the many fields that benefit from the special properties of noble metal nanoparticles [19–21]. It is possible to synthesize metal nanoparticles under mild and uncomplicated circumstances. Applying a stabilizing layer such as Cetyltrimethylammonium Bromide (CTAB), Polyvinyl Alcohol (PVA), cyclodextrin, poly (methylhydrosiloxane), or Polyvinylpyrrolidone (PVP) enables the use of common reducing agents such as sodium borohydride, hydrazine, sodium citrate, thiols, amino acids, and polyols [13,14,22-26]. PVP is a

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B.KrishnaKrishn *et. al* International Journal of Pharmacetical Sciences Letters

Suicidal Ideation and Glucagon-like Peptide-1 Receptor Agonists: An Examination of Real-Word Data Gathered from the European Pharmacovigilance Database

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Abstract:

Context: It has just now come to light that liraglutide and semaglutide medications may carry the risk of suicide. So, we set out to study the likelihood of reporting suicidal thoughts and actions among GLP-1 receptor agonists. Methods: The European Pharmacovigilance database was the subject of a retrospective pharmacovigilance investigation covering the years 2018–2023. It was determined if GLP-1 RAs were more likely to report suicidal thoughts or behaviors by using disproportionality analysis (reporting odds ratio, ROR). Findings: 230 reports of incidents involving suicide thoughts or behavior were recorded. The following GLP-1 RAs were most often reported: liraglutide (38.3%), semaglutide (36.5%), and dulaglutide (16.1%). Suicidal thoughts (65.3%) and attempts (19.5%) were the most often reported occurrences. When comparing semaglutide to dulaglutide and exenatide, the disproportionality analysis revealed that semaglutide had a greater reporting likelihood of suicidal occurrences (ROR, 2.05; 95%CI, 1.40-3.01 vs. 1.81; 1.08-3.05). Similarly, compared to dulaglutide (ROR, 3.98; 95%CI, 2.73-5.82) and exenatide (ROR, 3.52; 95%CI, 2.10-5.92), liraglutide was linked to a greater reporting likelihood of suicide occurrences. While liraglutide had a higher reporting probability, semaglutide had a lower one (ROR, 0.51; 95%CI, 0.38-0.69). Results: Compared to other GLP1 RAs, semaglutide and liraglutide had much greater reporting probabilities of suicidal episodes. While the research does provide the reporting rates of suicide-related occurrences with GLP-1 RAs, it does not demonstrate causation. The Pharmacovigilance Risk Assessment Committee of the European Medicines Agency will likely address this matter in the future.

Relevant terms: disproportional reporting, glucagon-like peptide-1 receptor agonists, safety, pharmacovigilance, and a retrospective analysis.

1. Introduction

The EMA Pharmacovigilance Risk Assessment Committee (PRAC) has been conducting a continuing safety review of glucagon-like peptide-1 receptor agonists (GLP-1 RAs) since 11 July 2023 [1]. The risk of suicidal and self-harming thoughts in patients treated with these medicines is the primary focus of the data evaluation. It is common practice to provide GLP-1 RAs, which are incretin-mimetic drugs, to patients with type 2 diabetes mellitus (T2DM) [2]. This family of medications may reduce blood sugar levels, inhibit glucagon release in either hyperglycemia or euglycemia, and raise insulin secretion in response to hyperglycemia by activating GLP-1 receptors. Six GLP-1 RAs have been approved thus far in Europe. In 2006, exenatide was approved for the treatment of type 2 diabetes. In the years that followed, the European Medicines Agency green-lit liraglutide in 2009, lixisenatide in 2013, dulaglutide in 2014, and semaglutide in 2018. For financial reasons, the holder of the marketing authorization requested in 2018 that another GLP-1 RA, albiglutide, be removed from sale in Europe. It is standard practice to inject GLP-1 RAs under the skin. One pharmaceutical breakthrough that aims to increase compliance in diabetic patients is the new oral semaglutide formulation that will be launched in 2020. Patients at high risk for cardiovascular consequences from diabetes mellitus, such as those with coronary syndromes, heart failure, or chronic renal disease, have shown improvement in their condition after using GLP-1 RAs, which is a step forward in the field of pharmacology [3]. At the beginning of therapy and during dosage escalation, gastrointestinal symptoms (nausea, vomiting, diarrhea) are the most prevalent side effects of GLP-1 RAs. Thus, a slow titration is necessary to lessen the severity of gastrointestinal side effects [3]. Delays in stomach emptying, decreased food intake, and weight loss are some of the additional effects of GLP-1 RAs that have been shown over the course of many decades of study, in addition to their hypoglycemic, endocrine, and cardiovascular effects [4]. Reason being, GLP-1 receptors are expressed throughout the CNS, which includes

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Analysis of SGM 597, a flurbiprofen derivative, on breast cancer cell lines: effects on cell proliferation and apoptosis

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ABSTRACT

Purpose and Background: Breast cancer is a growing health concern, particularly among females. Researchers are concentrating on finding new medications that help combat breast cancer. There is a striking degree of biological similarity between breast cancer and prostate cancer. Accordingly, the 4-(4-chlorophenyl)-3-(1-(2-fluoro-[1,1'-biphenyl]-4-yl)ethyl), 5-((4-fluorobenzyl)thio)Research using the MCF-7 and MCF-10A breast cancer and mammary epithelial cell lines examined the effects of the chemical SGK597, which inhibits cell growth in prostate cancer.

Methods: To find out if SGK597 was cytotoxic or viable in MCF-7 and MCF10-A cell lines, the WST-8 technique was used. We used the JC-1 test to find out whether the potential across the mitochondrial membrane changed. Western blot analysis was used to evaluate the amounts of apoptosis-associated proteins, including Bax, Bcl-2, and c-PARP.

The IC50 values for MCF-7 were 28.74 μM and 17.28 μM after 24 hours of incubation with SGK597, while for MCF-10A, they were 65.9 μM and 50.5 μM, respectively. While MCF-10A cells did not exhibit a trend toward depolarization of the mitochondrial membrane potential in response to increasing concentrations of SGK597, MCF-7 cells did. No rise in the Bax/Bcl-2 ratio or c-PARP expression level was seen in western blot tests, suggesting the absence of apoptosis.

Results showed that SGK597 inhibited the growth of MCF-7 cells. These findings suggest that SGK597 might be an effective anticancer drug.

Definitions: thioether, triazole, apoptosis, flurbiprofen, breast cancer

INTRODUCTION

Among female cancers, breast cancer is by far the most prevalent. Breast cancer affects over 1.5 million people globally annually. Age, a woman's family medical history, and the BRCA1 and BRCA2 gene abnormalities that are believed to increase the likelihood of breast cancer are the primary risk factors for this disease in women (Becker, 2015; Sun et al., 2017). There is an ongoing need to discover new anticancer medications due to the high rate of cancer recurrence and the severe adverse effects of current chemo treatments (Ali et al., 2012). Meegan and O'Boyle (2019) report that novel anticancer medications target proteins with aberrant expression in cancer cells, in contrast to classic chemotherapeutic agents that primarily target cancer cells' DNA.

We know that chronic inflammation and cancer go hand in hand. So, anti-inflammatory medications might have a role in cancer prevention and therapy. Arachidonic acid is released from cellular phospholipids by the enzyme phospholipase A2 in response to inflammatory stimuli.

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Analyzing The Most Popular Turkish Medications' Patient Information Leaflets And Summaries Of Product Features For Readability

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Abstract:

Context and Objectives: The term "readability" refers to the degree to which a book is easy or difficult for readers to grasp. The purpose of our research was to assess the Turkish readability of a patient information leaflet and a product features summary. Methods: A cross-sectional study is what we've done here. In our study, we used the Turkish readability formulas developed by Ateşman and Bezirci-Yılmaz to assess the top-selling medications from the "Turkish Pharmaceutical Market Monitoring Report-8, 2020 Market Status in Terms of Sales Volume and Value" published by the Turkish Medicines and Medical Devices Agency in 2021. End result: A total of 69 goods had their 138 patient information leaflets and product characteristic summaries reviewed. In order to understand the texts, one needs a bachelor's degree or above, on average. With a p-value of 0.000, the product characteristics summary is much longer than the patient information leaflets. Ateşman calculation was simpler in terms of readability, but Bezirci-Yılmaz calculation was more difficult (p=0.007 and p=0.000, respectively). The results show that patient information booklets are not well-written, straightforward texts. All individuals, regardless of their level of education, should be able to read and comprehend the materials that will be given to the patients. Preparation for Pharmaceutical Use, Health Literacy, and Prospectus

Keywords: Health literacy, comprehension, Pharmaceutical Preparations, Prospectus

INTRODUCTION

According to Nielsen-Bohlman, Panzer, and Kin dig (2004), patients and their families have higher expectations of healthcare professionals in the modern system. The traditional doctor-patient dynamic has given way to one in which patients actively participate in their own healthcare by reading, processing, and acting upon written or spoken instructions. To properly carry out all of these responsibilities, a high level of health literacy is required (Ilbars & Özkan, 2020; Nielsen-Bohlman et al., 2004). The novel idea of health literacy combines the formerly separate concepts of health and literacy. Functional, interactive, and critical literacy are the three aspects of health literacy that the World Health Organization considers (Kanj & Mitic, 2009). The capacity for patients to comprehend and adhere to written materials including medication brochures, informed consent forms, and informative texts provided by healthcare professionals is known as functional health literacy (Erdoğan & Araman, 2017; Williams, Baker, Parker, & Nurss, 1998). Both the individual's health and the frequency with which they visit the hospital are negatively impacted by poor functional literacy (Baker, Parker, Williams, & Clark, 1998). The introduction of the summary of product characteristics (SmPC) and patient information leaflet (PIL) for newly licensed drugs was

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Bone Metabolism and Serum Osteocalcin in Osteoporotic Rats: The Role of Quercetin

Dr. Smithamadhuri, S.Kiran, L.Sunil, Lavanya N

ABSTRACT

Osteoporosis has been steadily increasing in prevalence among humans. Decline in the structural integrity of bones and soft tissues is the primary cause of this prevalent illness, which significantly impacts the quality of life for older individuals. One of the most popular medications for osteoporosis is quercetin, a flavonoid. Research into quercetin's pharmacological and therapeutic effects is, hence, crucial. Discover how quercetin affects bone metabolism and serum osteocalcin in rats with osteoporosis is the goal of this paper, which also aims to address certain issues with quercetin's therapeutic use. For this study, we developed an animal model of osteoporosis using 90 rats. Each group of animals received either a sham surgery, an ovariectomy, or quercetin for observation. Every rat in the study had an ovary removed, with the exception of the ones in the sham surgery group. Those rats in the quercetin observation group also received quercetin medication. One week after that, we measured the levels of serum osteocalcin and bone metabolism in all of the rats and made note of any relevant data. The study's findings demonstrated that quercetin improved the bone mineral density and tissue structure of osteoporosis rats, as well as raising their bone metabolism index from 53.49±3.41 to 86.27.2±4.22. It also raised their serum calcium level from 16.28±0.56 μg/l to 37.64±2.35 μg/l. It is clear that quercetin has beneficial effects on the treatment and prevention of osteoporosis, as well as on the promotion of bone metabolism in rats with osteoporotic bone disease.

Medications used to treat osteoporosis include quercetin and serum osteocalcin.

INTRODUCTION

One instance of systemic bone damage is osteoporosis. The microstructure of the skeletal soft tissue is completely destroyed, and there are much fewer bones per unit of body volume in the spine. There is now a much higher chance of it happening. Early osteoporosis symptoms include discomfort, spinal joint deformities, and a predisposition to fractures. People living with epilepsy will find their quality of life significantly diminished due to severe pain. Severe restrictions on the patient's usual range of motion may result from excessive spinal deformities. Disabilities caused by osteoporosis may last a lifetime and have a profound impact on patients' quality of life as well as on society, families, and individuals' financial stability. Currently, clinical studies investigating the causes and mechanisms of persistent osteoporosis patients mostly center on the body's faulty calcium metabolism. Low calcium causes osteoporosis, which may be readily caused by an abnormally low calcium intake. Although there is a certain therapeutic result from the use of sex hormones, calcium chloride, active phosphorus, vitamins C and D, calcitonin, diphosphate, and dihydrouridine in clinical therapy, the drug is costly and has considerable side effects. The most recent findings in medical study indicate that quercetin may help prevent and treat osteoporosis in older adults. A powerful estrogen antagonist, quercetin is a naturally occurring alkaloid found in plants [1]. People nowadays place a high value on quercetin, which is well-known for its widespread distribution in plants and its ability to mimic the biological actions of many enzymes. Antibacterial, anti-malignant, anti-depressant, anti-diabetic, hepatoprotective, and atherosclerotic effects are just a few of the numerous novel biological actions of peanut quercetin that have been unearthed in recent years[2]. Furthermore, quercetins have the ability to both increase and inhibit the induction of osteoblast white matter differentiation. This means that they can effectively prevent osteoclasts from absorbing more bone white matter, promote the formation of bone cells through osteoblast differentiation, and induce apoptosis in osteoclasts.

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Community Pharmacists' Pharmacovigilance Knowledge and Attitudes: A Cross-Sectional Survey

Divya, G.Rajani, Shilpadas, MD Solaiman50.G.Rajani, Divya, Adithyamathur, Abdul Karim

ABSTRACT

As part of their post-marketing monitoring efforts, all national and regional governments are obligated to establish a system for reporting adverse drug reactions, often known as pharmacovigilance. Consequently, it was crucial to optimize one's attitude and understanding of the system. The purpose of this research was to survey rural public healthcare pharmacists on their pharmacovigilance knowledge and attitudes. From July to December 2021 in Bantul Regency, Yogyakarta, Indonesia, 48 pharmacists from both hospitals and community pharmacies participated in this cross-sectional analytical observational study. We used chi-square to look for relationships between the variables, and descriptive statistics and frequency distribution analysis to get a feel for people's levels of understanding and sentiment about the pharmacovigilance system. Among those who took part, 60.4% had solid understanding and 52.1% felt positively about the system. A p-value of 0.045 further demonstrated the existence of a correlation between attitude and knowledge. Thus, among rural public healthcare pharmacists, there was a correlation between pharmacovigilance knowledge and attitude. Research like this strongly suggests that all healthcare providers, but notably pharmacists, should educate themselves on pharmacovigilance and incorporate it into their daily work.

Attitude, knowledge, rural, pharmacovigilance, pharmacist

INTRODUCTION

Improving the quality of public health is intimately tied to increasing the consumption of pharmaceutical products; hence, it is imperative that these products be both effective and safe. Proper use of pharmacological drugs delivers more advantages than hazards, but their effectiveness and safety rely on careful monitoring and attention (Aruru et al., 2021). Because of this, it is critical to adequately monitor pharmaceutical medication safety. To do this, pharmacovigilance—a mechanism for reporting Adverse Drug Reactions (ADRs)—must be put in place (Edrees et al., 2022; Liu et al., 2019). When it comes to pharmaceutical products, the World Health Organization (WHO) defines pharmacovigilance as "the science and activity concerned with the detection, assessment, understanding, and prevention of adverse reactions or other events" (Beninger, 2018). The goal of thisapproach is to make healthcare safer and better by reducing hazards associated with prescription medication usage. Healthcare providers, particularly in underdeveloped nations, have not fully contributed to the system since its inception in 1961 by the World Health Organization (WHO) (Yawson et al., 2022). As part of their post-marketing monitoring efforts, all national and international governments are obligated to engage in pharmacovigilance (Beninger, 2018).

Pharmacovigilance has expanded greatly over the last decade and is now facing many new difficulties. The public's expectations about the safety and efficacy of pharmaceutical medication usage will rise as a result of the fast distribution of information, which will further enable access to diverse medicines (Thomas, 2018). But this approach can only work if doctors and nurses report potential adverse drug reactions in their patients as part of routine patient care. Medical professionals in Indonesia have an ethical obligation to report any adverse drug reaction (ADR) they suspect to the country's pharmacovigilance center or the Monitoring Efek Samping Obat (MESO) facility. The Yellow Form, a tool for reporting medication side effects, may also be used to conduct

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Creating and testing an RP-HPLC technique to measure curcumin and metronidazole in a mixed dose form at the same time

Dr.Ratnasree, Dr.Rafia,.Shivaprasad, Noureen

ABSTRACT

Purpose and Background: This work set out to create and test a straightforward RP-HPLC technique for the simultaneous measurement of curcumin and metronidazole in bulk, as well as their combination dose form. The compounds in question are natural.

Methods: A model combination system was created using an in situ gel formulation that included metronidazole and curcumin. Using UV-detection at 254 nm, the chromatographic separation was achieved isocratically on an Eclipse XDB-C18 column with dimensions 150 mm x 4.6 mm and a particle size of 5 µm. The mobile phase that was fine-tuned included a 50:50 (v/v) combination of Phosphate Buffer pH4.5 and Acetonitrile. The flow rate was adjusted to 1.0 mL/min, and the injection volume was 10 µL. The approach was utilized for quality control tests of their combination medication product and was verified in conformity with International Council for Harmonization (ICH) standards.

The findings showed that metronidazole had a retention duration of 1.40 minutes and curcumin of 8.60 minutes. The linear responses were seen for curcumin and metronidazole, respectively, throughout the concentration ranges of 3.0-80 and 4.8-128 µg/mL, with limits of detection (LOD) values of 0.62 and 1.03 µg/mL and limits of quantification (LOQ) values of 1.88 and 3.13 ɛg/mL. No formulation components interfered with the identification of the two active compounds, and the precision findings were within acceptable limits (RSD<2%).

Curcumin and metronidazole in situ gel formulation total contents were determined using the suggested verified RP-HPLC technique. Routine quality control for their combined pharmaceutical use was shown to be possible by the validation findings, which also demonstrated that the suggested technique was simple, specific, and exact.

Developing an HPLC approach for the simultaneous measurement of curcumin and metronidazole

INTRODUCTION

Curcumin is an acronym for "curcuminoids," which are a class of compounds include 1,7-bis(4-hydroxy-3-METhoxy-phenyl)-1,6-heptadiene-3,5-ione. The primary component of Curcuma longa, often known as turmeric rhizome, is shown in Figure 1 (A). There is evidence of this herbal medication's therapeutic usage in Asian traditional medicine dating back more than a thousand years. No toxicities or bad side effects have been linked to CUR, even at extremely high dosages, and this has been confirmed in population-level studies. (Wächter et al., 2014; Bergine, Škalko-Basnet, Basnet, & Kristl, 2012; Basnet & Skalko-Basnet, 2011). Its photosensitivity, quick hydrolysis at alkaline pH, and fast systemic clearance, together with its poor water solubility, have restricted its therapeutic application. It is usual practice to increase CUR's effectiveness by using innovative drug delivery systems or by combining other medications (Yuan et al. 2012).

According to Chanda & Rakholiya (2011), Ejim et al. (2011), Lakshmi et al. (2016), and Sasidharan et al. (2014), CUR has the ability to improve the clinical results of several antibiotics and is therefore an attractive natural component in combination treatment. To minimize the risk of dosage-related side effects and defensive mechanisms,

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Ocrelizumab/Rituximab-Treated Multiple Sclerosis Patients' NK Cell Levels and Disease Activity

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Abstract:

***Background:** In order to slow down the course of multiple sclerosis (MS), researchers have recently concentrated on B lymphocytes and the potential use of targeted medications like ocrelizumab and rituximab to decrease inflammation. Our goal was to find out what factors predicted how well patients will respond to Ocrelizumab/Rituximab by analyzing their effects on immunological markers measured in the lab. Methods: Infusion treatment with an anti-CD20 medication was used in a retrospective single-center trial of multiple sclerosis patients. The results show that out of 277 treatment cycles, 64 patients were eligible to participate. The levels of B lymphocytes were found to decrease in absolute value and percentage after receiving anti-CD20 infusions, whereas the levels of NK cells were found to rise in absolute value and percentage three and five months following treatment ($p < 0.001$). A lower proportion of NK cells three months after infusion might predict disease activity six months following Ocrelizumab/Rituximab treatment, according to multivariate logistic regression analysis ($p = 0.041$). Conclusions: NK cell percentages are lower three months after anti-CD20 infusion, which is associated with disease activity six months after treatment, suggesting that NK cells may have a protective function in multiple sclerosis.*

Topics covered include NK cells, anti-CD20, ocrelizumab, and Rituximab, as well as multiple sclerosis.

1. Introduction

With a prevalence of 50-300 affected persons per 100,000 people, multiple sclerosis (MS) is the leading cause of neurological disability in young people [1]. MS is a chronic autoimmune inflammatory disease of the central nervous system (CNS). It has important epidemiological and social impacts. Throat swelling, demyelination, and axonal degeneration are the three hallmarks of this neuropathology. A lot about the pathophysiology of MS is still a mystery, even though we've learned a lot about it recently. Once thought to be T lymphocytes, the primary agents of the autoimmune response have recently come under scrutiny for their function in B lymphocytes and the possibility of reducing inflammation and disease progression by targeting these cells with

targeted medications [2]. As expected, infusional anti-CD20 medications (Ocrelizumab and Rituximab) are the most often prescribed second-line treatments for multiple sclerosis. These medicines are among the most efficacious on the market and may lower the risk of disease recurrence by 46-47% every year [3]. Research on the potential effects of these medicines on other immune cells, such as NK cells, is ongoing, although preliminary findings suggest that they may have consequences beyond B lymphocyte depletion [4]. One of the factors that may contribute to the development of autoimmune illnesses like multiple sclerosis is the diminished immunoregulatory function of NK cells, which may also play a role in controlling the effector activities of T cells. Results from the few studies that have looked at how anti-CD20 medications affect NK cells in multiple sclerosis patients have been inconsistent [4]. New evidence suggests that some MS treatments—including autologous marrow transplantation, Natalizumab, Fingolimod, and Interferon alpha—increase NK cell counts [5]. Furthermore, it has been shown that some treatments may enhance the biological activity of NK cells, such as Glatiramer acetate, Vitamin D3, Dimethylfumarate, Monomethylfumarate, Natalizumab, Ocrelizumab, and IFN-} [6].

2. Results

The 64 patients we found ranged in age from 25 to 72 years, with a median of 52.0 years and a mean of 51.6 ± 7.7 years. There were 37 females and 27 men. The average number of years that patients had been sick since

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Analyzing The Most Popular Turkish Medications' Patient Information Leaflets And Summaries Of Product Features For Readability

G.Thanusha, G.Suresh, L.Sunil, Bishwajit Patowary

Abstract:

Context and Objectives: The term "readability" refers to the degree to which a book is easy or difficult for readers to grasp. The purpose of our research was to assess the Turkish readability of a patient information leaflet and a product features summary. Methods: A cross-sectional study is what we've done here. In our study, we used the Turkish readability formulas developed by Ateşman and Bezirci-Yılmaz to assess the top-selling medications from the "Turkish Pharmaceutical Market Monitoring Report-8, 2020 Market Status in Terms of Sales Volume and Value" published by the Turkish Medicines and Medical Devices Agency in 2021. End result: A total of 69 goods had their 138 patient information leaflets and product characteristic summaries reviewed. In order to understand the texts, one needs a bachelor's degree or above, on average. With a p-value of 0.000, the product characteristics summary is much longer than the patient information leaflets. Ateşman calculation was simpler in terms of readability, but Bezirci-Yılmaz calculation was more difficult (p=0.007 and p=0.000, respectively). The results show that patient information booklets are not well-written, straightforward texts. All individuals, regardless of their level of education, should be able to read and comprehend the materials that will be given to the patients. Preparation for Pharmaceutical Use, Health Literacy, and Prospectus

Keywords: Health literacy, comprehension, Pharmaceutical Preparations, Prospectus

INTRODUCTION

According to Nielsen-Bohlman, Panzer, and Kin dig (2004), patients and their families have higher expectations of healthcare professionals in the modern system. The traditional doctor-patient dynamic has given way to one in which patients actively participate in their own healthcare by reading, processing, and acting upon written or spoken instructions. To properly carry out all of these responsibllities, a high level of health literacy is required (Ilbars & Özkan, 2020; Nielsen-Bohlman et al., 2004). The novel idea of health literacy combines the formerly separate concepts of health and literacy. Functional, interactive, and critical literacy are the three aspects of health literacy that the World Health Organization considers (Kanj & Mitic, 2009). The capacity for patients to comprehend and adhere to written materials including medication brochures, informed consent forms, and informative texts provided by healthcare professionals is known as functional health literacy (Erdoğan & Araman, 2017; Williams, Baker, Parker, & Nurss, 1998). Both the individual's health and the frequency with which they visit the hospital are negatively impacted by poor functional literacy (Baker, Parker, Williams, & Clark, 1998). The introduction of the summary of product characteristics (SmPC) and patient information leaflet (PIL) for newly licensed drugs was

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Analysis of SGM 597, a flurbiprofen derivative, on breast cancer cell lines: effects on cell proliferation and apoptosis

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ABSTRACT

Purpose and Background: Breast cancer is a growing health concern, particularly among females. Researchers are concentrating on finding new medications that help combat breast cancer. There is a striking degree of biological similarity between breast cancer and prostate cancer. Accordingly, the 4-(4-chlorophenyl)-3-(1-(2-fluoro-[1,1'-biphenyl]-4-yl)ethyl), 5-((4-fluorobenzyl)thio)Research using the MCF-7 and MCF-10A breast cancer and mammary epithelial cell lines examined the effects of the chemical SGK597, which inhibits cell growth in prostate cancer.

Methods: To find out if SGK597 was cytotoxic or viable in MCF-7 and MCF10-A cell lines, the WST-8 technique was used. We used the JC-1 test to find out whether the potential across the mitochondrial membrane changed. Western blot analysis was used to evaluate the amounts of apoptosis-associated proteins, including Bax, Bcl-2, and c-PARP.

The IC50 values for MCF-7 were 28.74 μM and 17.28 μM after 24 hours of incubation with SGK597, while for MCF-10A, they were 65.9 μM and 50.5 μM, respectively. While MCF-10A cells did not exhibit a trend toward depolarization of the mitochondrial membrane potential in response to increasing concentrations of SGK597, MCF-7 cells did. No rise in the Bax/Bcl-2 ratio or c-PARP expression level was seen in western blot tests, suggesting the absence of apoptosis.

Results showed that SGK597 inhibited the growth of MCF-7 cells. These findings suggest that SGK597 might be an effective anticancer drug.

Definitions: thioether, triazole, apoptosis, flurbiprofen, breast cancer

INTRODUCTION

Among female cancers, breast cancer is by far the most prevalent. Breast cancer affects over 1.5 million people globally annually. Age, a woman's family medical history, and the BRCA1 and BRCA2 gene abnormalities that are believed to increase the likelihood of breast cancer are the primary risk factors for this disease in women (Becker, 2015; Sun et al., 2017). There is an ongoing need to discover new anticancer medications due to the high rate of cancer recurrence and the severe adverse effects of current chemo treatments (Ali et al., 2012). Meegan and O'Boyle (2019) report that novel anticancer medications target proteins with aberrant expression in cancer cells, in contrast to classic chemotherapeutic agents that primarily target cancer cells' DNA.

We know that chronic inflammation and cancer go hand in hand. So, anti-inflammatory medications might have a role in cancer prevention and therapy. Arachidonic acid is released from cellular phospholipids by the enzyme phospholipase A2 in response to inflammatory stimuli.

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Analysis of Sambucus ebulus L. (dwarf elder) fruit extracts for their chemical composition and antioxidant potential, as well as their antibacterial activity against Trichophyton rubrum (Castell.) Sabour and other microorganisms

K.Anand kumar, P.Chandrashekar, .G.Thanusha, Karthan Pragathi

ABSTRACT

Purpose and Background: Sambucus ebulus L. has a long history of use in Anatolian traditional medicine. Based on traditional use, this research aims to explore the phytochemical composition, antibacterial activities, and antioxidant activities of S. ebulus fruit extracts, as well as their antifungal capabilities against Trichophyton rubrum (Castell.) Sabour.

The fruits of S. ebulus were used to make two different extracts. We used LC-MS/MS to determine the phytochemical makeup of the fruit extracts of S. ebulus. We used the broth microdilution technique to test the antibacterial activity against a panel of microorganisms. Furthermore, the disc diffusion technique was used to assess the antifungal activity of S. ebulus extracts against three yeasts and T. rubrum in vitro.

The main components found in the dried fruit methanol extract (DFM) were identified as hederagenin (5.38±0.4949 µg/g) and fumaric acid (3.06±0.0275 µg/g). The most prevalent ingredient in the fresh fruit juice (FFJ) was found to be fumaric acid, with a concentration of 3.97±0.0357µg/g. The extracts included hitherto unseen compounds including acacetin, chrysin, eupatilin, hederagenin, isosakuranetin, myricitrin, and rhamnocitrin. Both E. coli and Candida tropicalis were moderately inhibited by DFM, with MIC values of 625 mg/L and 312.5 mg/L, respectively. Both extracts were ineffective against Staphylococcus aureus and Proteus mirabilis, with MIC values of 1250 mg/L; however, T. rubrum proved to be resistant to both extracts. The antioxidant capacity of the extracts was measured using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical cleaning technique. With an IC50 value of 5.941±0.236 µg/mL and 7.893±0.939 µg/mL, respectively, DFM and FFJ demonstrated potent antioxidant activity against DPPH radicals.

In conclusion, our findings demonstrated that S. ebulus fruits could not be used in antifungal topical formulations, despite the fact that locals use them to cure nail fungus (onychomycosis). Furthermore, the antibacterial activity outcome is consistent with previous research in this area.

Antifungal activity, antioxidant activity, Sambucus ebulus, LC-MS/MS, and Trichophyton rubrum are all terms that relate to this study.

INTRODUCTION

Two species, Sambucus nigra and Sambucus ebulus, have been documented as being native to Turkey (Scopel et al., 2007; Senica, Stampar, & Mikulic-Petkovsek, 2019). The genus Sambucus is part of the Adoxaceae family and has thirty species worldwide. A shrub species, S. ebulus L. is found all throughout southwestern Asia (particularly in Iran and Turkey) and southern and central Europe (Shokrzadeh & Saravi, 2010). It goes by popular names like elderberry and dwarf elder.

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Analysis of bee pollen and bee bread (Perga) under a microscope and comparison with their outer layers

K.Sujitha, N.Rajashekar, G,Pratyusha, Dodda Neelima

ABSTRACT

Background and Aims: Bee pollen and bee bread (perga) are utilized as dietary supplements because of their high nutritional content and therapeutic properties. When compared to bee pollen, research shows that bee bread is more bioavailable. Some research have proposed that the reason for this is because the exine layers of pollen in bee bread become fragmented. The exine layer may be compromised, although no conclusive microscopic evidence has been found. For the first time, this research compared pollen grains from bee pollen samples with those from bee bread to determine whether the exine layers of the pollen grains were broken during fermentation.

Approach: Bee bread and pollen were gathered from the same hives and processed into slides for light and scanning electron microscopy analysis. Under the microscope, we examined and contrasted the two pollen slides.

The results showed that following fermentation, the exine layers of the pollen grains in bee bread did not show any signs of deformation.

Conclusion: The increased bioavailability of bee bread has been attributed, in several studies, to the pollen grains' deformation at the exine structure. However, thorough microscopical evidence using light and scanning electron microscopes has not been found to support it. After fermentation, our research found that the exine structures of bee bread pollen did not deform.

Subjects covered: microscopy, exine layer, bee pollen, bee bread (perga), and bees.

INTRODUCTION

Because of its high nutritional content,, plant pollen supplies honey bees with their essential protein requirements (Standifer, 1980). Honey bees gather pollen and keep it on their third set of legs as a pollen load (Alataş, Yalçın, & Öztürk, 1997; Almeida-Muradian, Pamplona, Coimbra, & Barth, 2005). These loads of pollen are referred to as "bee pollen" (also known as corbicular pollen or pollen gathered by bees) (Fuenmayor et al., 2014; Kňazovická et al., 2019). To make use of these pollen loads as food, honey bees must ferment them. As a result, the pollen is crushed and stored in the honeycomb before being mixed with the saliva secretions of the bees. Beeswax is then applied to the honeycomb (Nagai, Nagashima, Myoda, & Inoue, 2004). The presence of certain microorganisms in honey bee digestive secretions allows for fermentation to occur. These microbes include Lactic acid bacteria (LAB), Bifidobacterium spp., Saccharomyces spp., Pseudomonas spp., Streptococcus spp., and others (Gilliam, Wickerham, Morton, & Martin, 1974; Olofsson & Vásquez, 2008). The pollen fermented in honeycombs is known as "bee bread" or "perga" (Herbert & Shimanuki, 1978; Nagai et al., 2004; Silici, 2014). The process takes around two weeks to finish. It follows that bee bread contains and benefits from probiotic microbes (Kieliszek et al., 2018).According to

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The effectiveness of modifying Park's approach in treating strabismus in youngsters

G.Thanusha [1],G.Suresh [2],L.Sunil [3],Bishwajit Patowary [4].

Abstract

Goal: Examine if modified Park's approach works well for strabismus patients' kids.
Methods: From January 2019 to December 2021, a total of 120 patients were recruited at the Anhui Provincial Children's Hospital in Anhui, China, in the Department of Ophthalmology. Each of the two groups—the study and the control—contained sixty patients. The research group underwent a modified Park's approach, which featured an intermuscular membrane incision and a conjunctiva two-layer suture method, whereas the control group got rectus muscle adjustment suture using a normal incision. Numerous factors were evaluated, including patient satisfaction, tear film performance, and perioperative indications.
Findings: There was a substantial reduction in intraoperative blood loss, surgical time, and hospital stay for the study group ($p < 0.01$). Additionally, it had a substantially lower corneal staining score ($p < 0.01$), a significantly greater Schirmer's time, and a tear film break-up time (TFBUT) time. The study group's satisfaction level was much greater than the control group's ($p < 0.05$). Clinical effectiveness was also higher (91.67%) than in the control group (83.33%). Furthermore, compared to the control group (11; $p < 0.05$), the study group showed a considerably decreased incidence of complications (5).
In conclusion, enhanced Park's approach results in excellent effectiveness and a decreased incidence of problems while also improving perioperative indicators, tear film function, and satisfaction level. This implies that it might be a good alternative to the standard care given to kids with exotropia. However, in order to prove that this treatment approach is better, long-term follow-up data will be needed.
Keywords: conjunctiva, two-layer suture, intramuscular membrane, Park's method, and strabismus

INTRODUCTION

Strabismus, characterized by misaligned extra ocular muscles, can result in a deviation in eye position. It is a relatively common condition among adolescents, with a prevalence of around 4 %. Treatment of strabismus is time-consuming and often leads to psychological stress for both patients and their families [1,2]. Surgical correction is currently the main approach, but it carries the risk of complications such as corneal exposure and surface damage, which may affect tear film function and impact surgical outcomes and patient satisfaction [3,4]. As a result, safeguarding the cornea during surgery and reducing postoperative complications have become key priorities in clinical practice. In recent years, rectus recession has emerged as a preferred surgical option for strabismus treatment. It offers advantages such as shorter operation time, improved visual field during surgery, and fewer postoperative side effects [5]. However, this technique is not without issues, including eyelid scarring and conjunctival wounds [6]. In comparison, modified Park's technique has gained popularity in strabismus surgery due to its smaller conjunctival incisions, reduced postoperative discomfort, and minimal aesthetic impact [7]. In

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Impact of tinidazole gargle and dentong Xiaoyanling on gingival sulcus factor, dental health, and periodontal metrics in chronic periodontitis

P.Chandrashekar [1],K.Anand Kumar [2],E.Samantha [3],Korada Ramya [4].

Abstract

The goal is to find out how intense tinidazole gargles in addition to Dentong Xiaoyanling affect patients with chronic periodontitis.

Techniques: Ninety-six (96) patients with chronic periodontitis who were admitted to Chun'an County Traditional Chinese Hospital in Qiandaohu Town, China between January 2021 and December 2022 were split into two groups at random: the study group received Dentong Xiaoyanling in addition to concentrated tinidazole gargle treatment, while the control group received the same treatment. The two groups' clinical efficacy, adverse responses, oral health status, gingival sulcus factor (GSF), and periodontal markers were compared.

Results: Before treatment, there were no significant differences ($p > 0.05$) between the two groups' periodontal markers, GSF, or oral health score. However, the periodontal markers, GSF, and oral health score of the two groups substantially decreased ($p < 0.05$) after therapy with Dentong Xiaoyanling and/or concentrated tinidazole gargle, with the study group seeing more dramatic reductions. The group that received treatment with a combination of Dentong Xiaoyanling and concentrated tinidazole gargle had a considerably greater ($p < 0.05$) level of clinical effectiveness (91.67%) compared to the control group (75%). Additionally, there was no discernible difference in the two groups' incidence of adverse events before and after therapy ($p > 0.05$).

In summary, treating chronic periodontitis with a concentrated tinidazole gargle combined with Dentong Xiaoyanling reduces gum inflammation locally, speeds up symptom relief, and increases dental health. Further methodologies will need an expanded sample size from a variety of clinical contexts to validate the efficacy of this technique.

INTRODUCTION

Chronic periodontitis (CP) is one of the most common infectious illnesses in clinical dentistry with patients typically infected with various periodontal pathogenic bacteria [1]. Although there is no uniform standard for treating chronic periodontitis at the moment, treatment principle emphasizes the management and removal of dental plaque, calculus and other pathogenic irritants, effectively decreasing gingival inflammation [2]. Drug therapy, comprising anti-inflammatory and antibacterial drugs, is the primary treatment for chronic periodontitis. Commonly used anti-inflammatory drugs are non-steroidal pharmaceuticals, while anti-bacterial drugs commonly used are nitroimidazoles and macrolides [3]. Single-drug therapy has a far from perfect clinical outcome, thus treating patients with a combination of Western and Chinese medicine has emerged as one of the major foci of clinical research [4]. Tinidazole rinse concentrate is a broad-spectrum antibacterial agent. Its antibacterial activity is achieved by preventing the formation of harmful bacterium DNA. Associated local inflammatory response will be decreased at any time once the patient's local pathogenic germs are under control and clinical symptoms will noticeably improve. Primary constituents of *Dentong Xiaoyanling* include *gypsum, mustard gypsum, Qing dai, Angelica Dahurica, Fang Feng,* and others. Its clinical effects include carbuncle clearance, as well as pain alleviation, which is critical in the etiology of dental disorders such as chronic periodontitis and gum inflammation. Therefore, this research investigates the efficacy of the combination of tinidazole gargle and *Dengtong Xiaoyanling* for the treatment of chronic periodontitis.

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Impact of respiratory treatment with bronchodilators on pulmonary function, mental health, and health-related behaviors in COPD patients

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Abstract

The aim of this study is to examine the impact of administering bronchodilators in conjunction with respiratory treatment on the health behavior, psychological state, and pulmonary function of individuals suffering from Chronic Obstructive Pulmonary Disease (COPD).
Method: Between January 2021 and January 2023, 90 COPD patients were treated at the First People's Hospital in Fuyang, Hangzhou, China. This data was analyzed retrospectively. Three groups of patients were assigned: 26 patients received budegopher, 28 patients received symbicor, and 36 patients received both budegopher and respiratory care in combination. Lung function, psychological status (as measured by the Health Behavior Scale (HPL), the Self-Rating Depression Scale (SDS), and the Self-Rating Anxiety Scale (SAS) were noted.
Results: Following therapy, there were notable variations in the three groups' forced vital capacity (FVC) and forced expiratory volume in one second (FEV1). The symbicor group outperformed the budegopher group in terms of outcomes, while the combination group outperformed both the budegopher and symbicor groups in terms of improvement ($p < 0.001$). Group differences were found in pairwise comparisons of health behavior (HPL) and psychological state (SAS and SDS). There were modest positive relationships between health-promoting activities (HPL) and lung function indicators (FEV1, FVC) and negative connections with unfavorable psychological attitudes (SAS, SDS). Health-promoting activities (HPL) and negative psychological attitudes (SAS, SDS) had a somewhat unfavorable correlation.
In summary: Bronchodilator therapy in conjunction with respiratory treatment has significant promise in improving lung function, reducing depressive symptoms, encouraging healthy lifestyle choices, and hastening the recuperation of COPD patients. Nonetheless, there can be minute differences in the medicinal effects of various medications, necessitating further research.
Keywords: COPD, respiratory treatment, Symbicor, Budegopher, negative attitude, and healthy conduct

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) has emerged as a prominent focus in clinical research, driven by rising incidence attributed to factors such as air pollution, tobacco consumption, and aging population [1]. Limited efficacy of singular drug interventions in COPD treatment has prompted concerns over increased burden on the lungs of affected individuals [2,3]. Consequently, the integration of respiratory care has become imperative. Symbicor, a bronchodilator employed in COPD management, comprises two components, budesonide and formoterol, known for their capacity to relax bronchial smooth muscle and enhance ventilatory function [4,5]. Additionally, budegopher has demonstrated efficacy in controlling disease progression and improving lung function in COPD patients. Nevertheless, the practice of combining respiratory care with bronchodilators in clinical treatment of COPD remains uncommon. This study therefore aims to investigate the impact of combined respiratory nursing and bronchodilator therapy on lung function, psychological well-being, and health behavior of COPD patients.

METHODS

General information

Ninety patients diagnosed with COPD and treated at The First People's Hospital of Fuyang, Hangzhou, China between January 2021 and January 2023 constituted the study cohort. Patients were categorized into three groups based on treatment modalities: budegopher group (26 cases, administered with budegopher), symbicor group (28 cases, subjected to symbicor treatment), and combination group (36 cases, receiving a combined

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Preparation and characterization of doxorubicin HCl loadedchitosan nanoparticles by w/o emulsion method

P.N. Pallavi

Abstract

Controlled and specific medication delivery using polymeric nanoparticles has received considerable attention lately. The goal of this research was to create doxorubicin-loaded chitosan nanoparticles and test their efficacy. Nanoparticles lacked aggregation, according to scanning electron microscopy. There was no evidence of a chemical reaction between the medication and polymer in the FTIR spectra. Research conducted in vitro on medication release has provided evidence that it is possible to prolong drug release. Drug release studies demonstrate the prolonged release after vigorous agitation produces nano-sized particles.

Key-Words: Nano particles, FTIR, SEM, Agglomeration

Introduction

Recently, there has been a lot of focus on improving medication delivery via the creation of colloidal carrier systems. There has been a great deal of study dedicated to the use of nanoparticles in the pharmaceutical industry in recent decades.1 Polymeric nanoparticles have received the greatest attention among carriers. Because of their simple manufacturing, biodegradability, ability to modify bio distribution, and decreased toxicity, chitosan nanoparticles have lately received attention in targeted medication administration. These particles' ability to bind to negatively charged cell membranes and, maybe, to be taken up by cells, is promising for the treatment of solid malignancies. When considering intravenous delivery, it's important to consider how positively and negatively charged particles will interact with various components of the blood. Doxorubicin administration via the mucosa is an attractive method because of the possibility that these modifications would modify the drug's biodistribution and/or organ membranes' interactions with cells and/or membranes.2 Chitosan has showed excellent biocompatible feature 3 and breakdown by lysosome enzyme in serum.4 The current investigation used a no-emulsion approach to producing nanoparticles.

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How Trustworthy Professional Activities in Pharmacy Are Perceived by Undergraduate Students

Soujanyadaniel, V.Balamani, Bibu prasad, Jala Naresh

Abstract

Introduction: Efforts in pharmacy education are focused on attracting students by successfully communicating the pharmacist's value to the health care team, as the number of applicants continues to decline. To lay out the anticipated duties and obligations of recent pharmacy graduates, the American Association of Colleges of Pharmacy (AACP) released entrustable professional activities (EPAs). Whether or whether these claims strike a chord with the public and entice students to study pharmacy is an open question. Innovation Overview: A survey was administered to students using EPA statements in the online undergraduate course PHAR1001: Orientation to Pharmacy. Before and after taking an introductory pharmacy course for undergraduates, all students were asked to fill out the survey. Participants were asked to rate the expected frequency of each EPA activity in all pharmacy practice settings and if they thought the activity was relevant to pharmacy practice. Results: 283 students filled out the pre-course survey, while 258 students finished the post-course survey. Prior to the course, there was a high degree of agreement (>80%) about the practical significance of eleven out of fifteen EPA statements. Five EPA statements showed a considerable rise in the role's relevance and expectation in pharmacy practice, continuing the high level of agreement from the pre-course survey. Results: Even before finishing the pharmacy course, the majority of students identified the EPAs as examples of what a pharmacist does. This was true independent of their level of background knowledge in the field. A credible explanation of the pharmacist's professional activities could be a good way to let others know what a benefit they provide. Pharmacy recruiting, trustworthy professional activities, online pharmacy education, and pharmacy education

INTRODUCTION

The pharmacy profession is experiencing a shortage of qualified candidates, therefore educational institutions are trying to attract students by emphasizing the vital role that pharmacists play in patient care. Given the nationwide decline in enrollment and applications, this has been an important priority for the majority of pharmacy schools in the last several years. Achieving this objective has been a focus of the pharmacy education community, which has worked to define the scope of practice for pharmacists. The American Association of Colleges of Pharmacy (AACP) released a set of entrustable professional activities (EPAs) in 2017 that outline the core competencies and duties that every pharmacy school graduate should have mastered.1 The EPA statements seem to represent professional standards in practice, according to recent studies on how contemporary pharmacy students and pharmacy preceptors see them. Unfortunately, nobody knows whether these claims represent the public's or patients' expectations or knowledge of pharmacists' work. The literature also lacks an examination of undergraduates' views, expectations, and understanding of the pharmacist's function within the healthcare team. In this study, undergraduates enrolled in a pharmacy elective were asked to reflect on their own preconceived

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Treatment of Patients with Escherichia coli Bacteremia in a Small, Single-Center Community Hospital: An Approach to Antimicrobial Stewardship

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Abstract

Purpose: *Inaccurate findings from antimicrobial susceptibility testing (AST), high expenses, and a lack of funding are just a few of the problems that pharmacist-led antimicrobial stewardship initiatives might face. In particular, resistance to gram-negative pathogens has grown since the COVID-19 pandemic. The majority of infections in a little community hospital with only one center are gram negative, with Escherichia coli infections being the most common. Consequently, the purpose of this research is to examine the pandemic's effects on antimicrobial stewardship initiatives aimed at fighting Escherichia coli and other ESBL pathogens, as well as the burden of gram-negative bacteremia. Methods: Patients from a local community hospital who were 18 years old or older were examined in a retrospective cohort study. If patients' blood cultures did not show a positive result for Escherichia coli and antibiotics were not started while they were in the hospital, they were not included in the study. Determining the duration of hospital stay was the main goal. Antibiotic de-escalations, antibiotic duration, time to final antibiotic treatment, serum procalcitonin levels, blood culture availabilities, MIC breakpoints, and Clostridioides difficult occurrences are critical secondary outcomes. Among the seventy-four individuals diagnosed with gram-negative bacteremia, 41 tested positive for Escherichia coli. The duration of stay for patients with Escherichia coli bacteremia who remained in the intensive care unit was 13.6 days, according to the primary endpoint statistics. The average duration of stay for patients with bacteremia caused by Escherichia coli in a non-intensive care unit context is 7.3 days, whereas the length of stay for patients with bacteremia caused by E. septic shock in the same situation is 6.8 days. Results: Antimicrobial stewardship programs (ASPs) in small community hospitals confront a number of obstacles; nonetheless, this particular ASP is making good use of its policies and resources to reduce hospital stays for patients with Escherichia coli bacteremia and increase the use of appropriate antibiotics. Coli form bacterium, COVID-19, bloodstream infection, procalcitonin, and the Antimicrobial Stewardship Program are some of the related terms.*

Introduction

The goal of Antimicrobial Stewardship Programs (ASP) is to reduce antibiotic resistance and the overuse of antibiotics. Acute care hospitals in the United States give antibiotics, and over 30% of those medications are either not needed or are not effective. The Antibiotic Stewardship Program (Core Elements) was introduced in 2014 by the Centers for Disease Control and Prevention (CDC) and is now being used in hospitals nationwide. Updates to the Core Elements include additional sections on hospital leadership's dedication, pharmacy knowledge and experience, taking action, monitoring progress, reporting findings, and education.4 From 2015 to 2020, the proportion of hospitals using ASP rose from 48% to 91%.5 Along with the fight against COVID-19, Antimicrobial Stewardship Programs became an essential component of healthcare systems nationwide in 2020 and 2022. In light of the apparent link between the COVID-19 pandemic and the subsequent increase in antibiotic resistance, it was necessary to investigate regional patterns in community hospitals more thoroughly. A rise in healthcare-associated infections, an uptick in the use of antibiotics, and problems with enforcing infection control measures are all outcomes of the COVID-19 pandemic. Hospitals have been seeing sicker patients with longer lengths of stay because to the pandemic, which has led to the development of more resistant illnesses. This is especially true in hospitals, where the prevalence of enterobacterales that produce extended spectrum beta-lactamase (ESBL) has surged by 32% between 2019 and 2020.1 The majority of gram-negative

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A Review of In-Vivo and In-Situ Antioxidant Activity Models

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ABSTRACT

Because of our hectic lives and lack of physical activity, antioxidants are being heralded as a miracle cure for a wide range of lifestyle disorders, including aging, cancer, diabetes, cardiovascular disease, and other degenerative conditions. Pollution and exposure to dangerous chemicals add to these already devastating impacts. The buildup of dangerous free radicals may be caused by all of the aforementioned. This article delves further into several antioxidant activity models, both in vitro and in vivo.

INTRODUCTION:

The term antioxidant originally was used to refer specifically to a chemical that prevented the consumption of oxygen. In the late 19th and early 20th century, extensive study was devoted to the uses of antioxidants in important industrial processes, such as the prevention of metal corrosion, the vulcanization of rubber, and the polymerization of fuels in the fouling of internal combustion engines 1. An antioxidant is a molecule capable of slowing or preventing the oxidation of other molecules. Oxidation is a chemical reaction that transfers electrons from a substance to an oxidizing agent. Oxidation reactions can produce free radicals, which start chain reactions that damage cells. Antioxidants terminate these chain reactions by removing free radical intermediates, and inhibit other oxidation reactions by being oxidized themselves. As a result, antioxidants are often reducing agents such as thiols, ascorbic acid or polyphenols2. Although oxidation reactions are crucial for life, they can also be damaging; hence, plants and animals maintain complex systems of multiple types of antioxidants, such as glutathione, vitamin C, and vitamin E as well as enzymes such as catalase, superoxide dismutase and various peroxidases. Low levels of antioxidants, or inhibition of the antioxidant enzymes, causes oxidative stress and may damage or kill cells. As oxidative stress might be an important part of many human diseases, the use of antioxidants in pharmacology is intensively studied, particularly as treatments for stroke and neurodegenerative diseases. However, it is unknown whether oxidative stress is the cause or the consequence of disease. Antioxidants are also widely used as ingredients in dietary supplements in the hope of maintaining health and preventing diseases such as cancer and coronary heart disease. Although initial studies suggested that antioxidant supplements might promote health, later large clinical trials did not detect any benefit and suggested instead that excess supplementation may be harmful3. Antioxidants are classified into two broad divisions, depending on whether they are soluble in water (hydrophilic) or in lipids (hydrophobic). In general, water-soluble antioxidants react with oxidants in the cell cytosol and the blood plasma, while lipid-soluble antioxidants protect cell membranes from lipid peroxidation1. These compounds may be synthesized in the body or obtained from the diet4. The different antioxidants are present at a wide range of concentrations in body fluids and tissues, with some such as glutathione or ubiquinone mostly present within cells, while others such as uric acid are more evenly distributed. Some antioxidants are only found in a few organisms and these compounds can be important in pathogens and can be virulence factors5. In general, antioxidant systems either prevent these reactive species from being formed, or remove them before they can damage vital components of the cell6. However, since reactive oxygen species do have useful functions in cells, such as redox signaling, the function of antioxidant systems is not to remove oxidants entirely, but instead to keep them at an optimum level7.

Free radicals may be defined as chemical species associated with an odd or unpaired electron. They are neutral, short lived, unstable and highly reactive

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B.Sudhakar *et. al* International Journal of Pharmacetical Sciences Letters

The Anti-Fertility Activity and Phytochemical Screening of Curcuma Aromatica Salisb

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ABSTRACT

The practice of traditional medicine for the control of fertility in most parts of India is based on the uses of plant medicines for many years. The fact that herbal medicines have been employed for such a long time does not guarantee their efficacy and safety. The aim of the present study was, therefore, to carry out phytochemical screening, efficacy and safety studies on one of the traditionally used antifertility plants: Curcuma aromatica Salisb. The secondary metabolites of the rhizomes of this plant were determined. The ethanolic and aqueous extract of the rhizomes of this plant were investigated for their antifertility activity in female rats The identification of the secondary metabolites showed that the rhizomes of the plant contained phytosterols, alkaloids, carbohydrate and saponins. The ethanolic and aqueous extract of this plant at two different doses of 200mg kg -1 and 400 mg kg -1 b.w. prevented the pregnancy. The aqueous extract were found to possess more significant ($p<0.001$) antifertility activity compared to alcoholic extract. All these observations suggest that the extract has antifertility effect and is safe at the effective antifertility doses employed in this study.

INTRODUCTION:

The investigation of plant constituents with anti-fertility properties represents a potential alternative approach to birth control from the existing available methods. If an estrogen from a local source could be shown to be active in humans, it would be of great value as a fertility-regulating agent. It is noted that anti-fertility agents work by disrupting or desynchronizing pre-ovulatory and pre-implantation events. Anti- fertility activity is often due to estrogenic activity, but can also be due to anti-estrogenic activity. Furthermore, plants can act as anti-fertility agents. These plants can be classified according to their activity profile such as Anti-ovulatory plants; Interceptory and Abortifacient plants; and uterine tonus and uterine stimulants. In addition, there are also plants that regulate fertility in males. These include antispermatogenic plants; spermicidal and semen coagulant plants; and fertility inhibiting plants 1. The development of new fertility regulating drug from medicinal plants is an attractive proposition, because from times immemorial human shave relied on plants and their products as sources of drugs and therapeutic agents, although in recent times, synthetic drugs are used extensively in modern medicine. However many modern medicines are developed through the clues obtained from phytochemical. Family planning has been promoted through several methods of contraception, but due to serious adverse effects produced by synthetic steroidal contraceptives, attention has now been focused on indigenous plants for possible contraceptive effect. Although contraceptives containing estrogen and progesterone are effective and popular, the risks associated to the drugs have triggered the need to develop newer molecules from medicinal plants. Hence, there is a need for searching suitable product from indigenous medicinal plants that could be effectively used in the place of pills. More over the phytochemical even today are important resources for medicine. Rapid population growth has caused a serious problem in economic growth and human development in developing countries. The control of human fertility, in the sense of its limitation is the most important and the urgent one amongst all bio-social and medicinal problems, confronting mankind today. Birth-control is a regimen of one or more action, devices, or medication followed in order to prevent deliberately or reduce the likelihood of a woman becoming pregnant or giving birth. Methods and intentions, typically termed for birth-control may be considered a pivotal ingredient to family planning. Mechanism which is intended to reduce the likelihood of the fertilization of an ovum by a spermatozoon may more specifically be referred to as Contraception 2.

MATERIALS AND METHODS:

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The Role of Vitamin D in Hypoxia-Induced Brain Injury in Neonatal Rats and the Acid-Sensing Ion Channel 1a Signaling Target

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ABSTRACT

This study aimed to examine the protective mechanisms mediated by vitamin D and acid-sensing ion channel 1a in newborn rats exposed to hypoxic-ischemic brain injury. Each of the three groups, consisting of 108 Sprague Dawley rats total, received 36 rats: Group A, which was subjected to a sham surgery; Group B, which was exposed to hypoxic-ischemic brain injury; and Group C, which was treated with vitamin D. To evaluate the permeability of the blood-brain barrier, a rat model of hypoxic-ischemic brain injury was developed. Vitamin D receptor gene and protein expressions, malondialdehyde levels, acid-sensing ion channel 1a, 1,25(OH)2D3 concentrations, and superoxide dismutase activity were also examined in rat brain tissues. The results demonstrated that among the groups, Group C had larger concentrations of 1,25(OH)2D3 in brain tissues and blood, as well as lower levels of superoxide dismutase and malondialdehyde compared to Group B but lower levels than Group A ($p<0.05$). At 48 and 72 hours, the brain tissues of Group C had higher pH values than Group B, but lower values than Group A ($p<0.05$). Group C showed an improvement in blood-brain barrier permeability. Group C had higher levels of acid-sensing ion channel 1a compared to Group B, but lower levels compared to Group A ($p<0.05$). In addition, there were clear differences between Groups A and C in terms of vitamin D receptor, with Group B having a greater level ($p<0.05$). Finally, vitamin D supplementation enhanced superoxide dismutase activity, downregulated malondialdehyde, regulated acid-base balance, improved blood-brain barrier permeability, inhibited acid-sensing ion channel 1a, and vitamin D receptor, shielding hypoxic-ischemic brain damage in rats. The following terms are important: superoxide dismutase, hypoxic-ischemic brain injury, vitamin D, malondialdehyde, and acid-sensing ion channel 1a.

INTRODUCTION

Hypoxic-Ischemic Brain Damage (HIBD) in neonates refers to cranial and brain injuries caused by hypoxia and oxygen deprivation during fetal development and after birth[1]. It is a leading cause of neurological sequelae and even death in infants and young children[2]. HIBD encompasses both postnatal hypoxia and prenatal intrauterine distress, playing a significant role in increased infant mortality and the occurrence of long-term adverse diseases[3,4]. HIBD is a neurologic disorder associated with neuronal apoptosis, and its pathogenesis involves a series of pathological and physiological processes such as apoptosis, inflammatory responses and oxidative stress[5,6]. These processes, including energy depletion, membrane depolarization, edema, increased neurotransmitter release, elevated intracellular calcium ions, and anaerobic free radical production, all have detrimental effects on the developing brain. However, the exact pathological mechanisms of HIBD remain incompletely understood. Acid-Sensing Ion Channel 1a (ASIC1a) is important in HIBD[7]. ASIC1a is an ion channel activated by hydrogen ions and is widely distributed in the nervous system[8]. Meanwhile, it is crucial in the process of neuronal death

during hypoxic-ischemic conditions. By activating ASIC1a, intracellular calcium ion concentration increases, triggering a series of cell death-related mechanisms[9,10]. Currently, the understanding of the neuronal injury mechanisms mediated by ASIC1a remains incomplete. On the other hand, the protective mechanisms of vitamin D in HIBD have also drawn research attention[11,12]. Vitamin D is a fat-soluble vitamin that regulates cell differentiation, proliferation, and immune function[13]. Studies have indicated that vitamin D plays an important role in brain injuries, including its effects on neurotrophic factors, calcium channel regulation,

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Pioglitazone HCl solid dispersion formulations combining five polymers to improve dissolving profile

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Abstract

Many medicines with therapeutic promise are never developed because of their low water solubility. There are a variety of approaches that have been taken to increase the solubility of medications in water. Poorly water-soluble pharmaceuticals may have their solubility and, by extension, their bioavailability enhanced by the use of solid dispersion. The purpose of this research was to examine the influence of different polymers on the solubility of pioglitazone HCl by preparing solid dispersions of the drug using PEG 6000, PVP, Poloxamer 407, Eudragit EPO, and HPMC. Pioglitazone HCl solid dispersion was made by solvent evaporation technique. The yield, drug content, FT-IR spectrum, and in vitro dissolution investigations of the solid dispersions were analyzed. The reliability of the experiment is guaranteed by the histogram of responses and the descriptive statistics of responses. The findings obtained demonstrate that the dissolving profile of Pioglitazone HCl solid dispersion was greatly improved. After 30 minutes, the release of Pioglitazone HCl from solid dispersions including PVP K30, HPMC, PEG 6000, Eudragit EPO, and Poloxamer 407 is 75%, 74%, 100%, 50%, and 62%, respectively, whereas the release from Pioglitazone HCl alone is only 12.05%. The findings suggest that the solid dispersion approach is a viable option for enhancing the dissolving profile of weakly water soluble drugs.

Key-Words: Solid dispersion, Pioglitazone HCl, Eudragit EPO, PEG 6000

INTRODUCTION

Using cutting-edge molecular screening techniques, numerous promising new medication candidates have been found recently. Many medicines with therapeutic promise are never developed because of their low solubility in water. The main issue with weakly water soluble drugs is their low bioavailability due to their partial absorption. The dissolution rate of weakly water soluble medications has been increased using a variety of approaches, including salt creation, complexation with cyclodextrins, solubilization of pharmaceuticals in solvents, and particle size reduction. However, there are certain restrictions with these methods. [1-2]Dissolution characteristics and bioavailability of weakly water-soluble medicines may be greatly enhanced by using solid dispersions (SDs).[4-6,19] Using either the fusion, solvent, or solvent-fusion technique, one or more active substances may be dispersed in a solid state hydrophilic carrier or matrix.[3] SDs of weakly water-soluble medicines with the different pharmacologically inert carriers have been the subject of much research since 1961.[8].

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Pharmaceutics Course In-Class Activities Centering on Excipient Functions

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Abstract

Objective: In order to gauge how students felt about two things: 1) activities meant to deepen their understanding of how pharmaceutical excipients work in dosage forms, and 2) the tools provided to help them identify these excipients. A fundamental pharmaceutics course included in-class activities that focused on the functions of excipients. Topics addressed in the exercises included parenteral, ophthalmic, and nasal dosage forms; drug distribution to the skin; and liquid multiphase and single-phase systems. In order to help students understand the function of excipients, we provided them with certain materials. Student polling and class discussion followed the presentation of pharmacological formulations with several basic excipients in the exercises. In order to gauge how students felt about the excipient role-playing activities and the materials they used, an online poll was circulated.

What we found: With a response rate of 99%, eighty students took part in the survey. The activities improved students' understanding of the subject and their performance in the pharmaceutics and non-sterile compounding courses that were taught simultaneously, according to the students' opinions. During the exercises, students referred to various sources, including their own course notes (95%), lists of excipients provided by the instructor (24%), online search engines like Google and Bing (20%), the sixth edition of the Handbook of Pharmaceutical Excipients (18%), Micromedex/Martindale (16%), and the International Journal of Pharmaceutical Compounding (6%). Final thoughts. In pharmaceutics and non-sterile compounding classes across different pharmacy programs, students might benefit from targeted excipient exercises, which are a realistic way to improve their knowledge.

Pharmacy education, active learning, pharmaceutics, dose forms, excipients, compounding

INTRODUCTION

Only pharmacists, who have completed an interdisciplinary curriculum that includes coursework in pharmaceutics—"the science of preparing, using, or dispensing medicines"—are part of a full-service interdisciplinary healthcare team. The correct use of pharmaceutical excipients is a part of pharmaceutics and compounding art. These excipients are found in the vast majority of dosage forms and often make up the bulk of the dosage form mass.2 to 4 In addition, it is well-known that excipients may change the quality and effectiveness of drugs. three, five, One may usually find a list of the specific excipients used to make the dosage forms in the package insert5 and other professional sources. Because certain excipients might have negative effects, it is essential for compounding meds and providing patient care, including consultation, to have a broad knowledge of the excipients and their functions in dosage forms.8–10.(6, 8, 10–12) Additionally, the Entrustable Professional Activities Practice

Manager Domain includes dosage form compounding.13 and the North American Pharmacist Licensure Examination (NAPLEX) Competency includes dose forms or administration methods that often include excipients Both non-sterile compounding and fundamental pharmaceutics courses often include excipients and their functions.16 This content, along with other critical ideas taught in foundational pharmaceutics and/or non-sterile compounding courses, may be adequately covered by placing an improved focus on the functions of pharmaceutical excipients. Students may get more acquainted with resources that may be used to determine the functions of excipients if they are shown these resources in action. In addition, there are excipients that serve many purposes; for example, they may be used in more than one preparation or in distinct preparations altogether. Students may be better able to grasp the reasoning and factors that go into the inclusion of excipients in certain dosage forms and formulations if the functions of these ingredients are well explained. Therefore, there may be a number of advantages to improving the excipients' functions in a basic pharmaceutics and/or non-sterile compounding course. Several interventions in pharmaceutics courses were found in the literature study, 17,10 to 30 There was a lack of data, however, about pharmaceutics courses placing a greater focus on the functions of excipients. Consequently, this research set out to accomplish two things: 1) gauge how students felt about activities meant to deepen their understanding of the functions of pharmaceutical excipients in dosage forms, and 2) determine how they felt about using various resources to determine which excipients were used.

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Amanita Phalloides Intoxication Gene Expression Patterns In Mice: Apoptotic and Necrotic Pathways

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ABSTRACT

The Amanita phalloides mushroom is the most dangerous in the world, and it induces abrupt liver failure, which is the main goal of this study. Hepatotoxicity is caused by the most powerful toxin, α-amanitin (α-AMA), which inhibits RNA polymerase II in hepatocytes and interrupts protein synthesis. Nevertheless, there is a severe lack of sufficient knowledge about the processes that lead to hepatotoxicity produced by α-AMA. This work seeks to uncover the intricate processes of necrosis and apoptosis that take place in mouse hepatocytes as a function of the duration of in vivo exposure to A. phalloides. Methods: The seven-mice BALB-c group was split into five subgroups: control, α-AMA-2, α-AMA-12, α-AMA-72, and α-AMA-96. Mice were given an oral dose of A. phalloides mushroom extract containing 10 mg/kg of α-AMA to simulate poisoning. After 2, 12, 72, and 96 hours, the mice were killed. Afterwards, the RT-qPCR technique was used to measure the amounts of TNF-α, Bax, caspase-3, and Bcl-2 gene expression in liver tissues. Additionally, histological evaluations were conducted to assess damage to liver tissues over time. The findings demonstrated that, when comparing the groups, the levels of the proinflammatory cytokine TNF-α mRNA expression in mouse liver tissues rose at 2 and 12 hours following A. phalloides administration, according to the RT-qPCR data. After ingesting A. phalloides, the levels of Bax mRNA expression spiked at 12 and 72 hours. When comparing the groups at 72 and 96 hours, we found that caspase-3 mRNA expression levels were higher, but Bcl-2 mRNA expression levels were lower. In conclusion, our results demonstrated that apoptotic mechanisms become effective after A. phalloides mushroom poisoning, after which necrotic processes emerge. Finally, novel therapeutic options may be devised by understanding the processes of A. phalloides-induced hepatotoxicity.

Keywords: α-amanitin, TNF-α, Bax, caspase-3, Bcl-2, RT-qPCR

INTRODUCTION

More than 90% of the fatalities caused by mushroom poisoning on a global scale occur as a consequence of Amanita phalloides (Vaill.) Link species, the most lethal poisonous fungus known to man (Vetter, 1998). Liver necrosis and subsequent hepatorenal phase development are clinical features of A. phalloides poisoning. Deterioration of renal and hepatic function, hyperglycemia, delirium, and disorientation may occur in patients over time (Becker et al., 1976). There is no known human mortality threshold for A. phalloides, however 20–79% of poisoned individuals acquire chronic liver disease (Sernè et al., 1996; Yilmaz, Er mis, Akata, & Kaya, 2015). The latency phase, which begins after 6–24 hours after consuming

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A Systematic Review on the Effects of Educational Interventions in Schizophrenia Treatment Programs

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Abstract

Treatment of schizophrenia requires not just antipsychotics but also other measures like education. The purpose of this research is to determine how effective educational interventions are for persons with schizophrenia (PwS) as part of treatment programs. A manual search in addition to searches in two electronic databases (Science Direct and PubMed) were used to identify papers that met the criteria. A number of precise phrases were included in the search, including: ("people with schizophrenia" OR "patients with schizophrenia"), "education" OR "knowledge"), and "medication adherence" OR "medication compliance" OR "medication persistence"). This systematic review followed the PRISMA reporting standards. Articles were screened for inclusion and data was extracted by a team of three reviewers. Using a technique developed by the Cochrane Collaboration to evaluate the risk of bias in randomized trials, the quality of the chosen studies was determined. From 2012 to 2022, a total of 666 studies were considered; however, only seven of them were deemed suitable for a comprehensive assessment. Patients may receive educational treatments as part of their treatment plan or as an independent psychoeducational program aimed at the whole family or caregiver. Many different types of medical experts, such as researchers, therapists, psychiatrists, and pharmacists, provide these treatments. Each intervention has a different length, but often consists of three to eight sessions, with 45 to 120 minutes of each session. When it comes to enhancing adherence, quality of life, stigma, and insight, educational treatments provide mixed results. But their knowledge scores, social functioning, and cognitive abilities all show improvement. Variations in patient characteristics, techniques, and measuring tools are part of the limitations that impact research findings. Clinicians might use these results to personalize educational programs in the future, taking into account each patient's unique requirements and features.

Education, interventions, knowledge, schizophrenia, and systematic review are all terms that pertain to the topic of adherence.

INTRODUCTION

One of the most prevalent mental health issues in the world, schizophrenia is a long-term mental illness. Reports from the Global Burden of Disease indicate that around 20% of the global population, or 20 million individuals, are diagnosed with schizophrenia (Collaborators, 2018). Disorganized thought patterns, delusions, and hallucinations are hallmarks of the schizophrenia spectrum illness as it manifests clinically. Schizophrenia sufferers also struggle to communicate, have a distorted view of reality, and have impaired cognitive function; as a consequence, they have trouble carrying out daily tasks and have worse social functioning (Farah, 2018; Kahn et the year 2015). Insightlessness and poor treatment compliance are hallmarks of schizophrenia, a severe and persistent disorder (Xia et al., 2013). Medication and long-term therapy are necessary for schizophrenia in order to alleviate psychiatric symptoms and avoid recurrence. Positive symptoms may be efficiently managed with antipsychotic medication, according to several studies. However, negative symptoms and cognitive impairment, which are linked to reduced social functioning, are more difficult to address. As a result, helping persons with schizophrenia rehabilitate requires more than just medicine. After leaving the hospital, people with schizophrenia often struggle to adhere to treatment plans, take their medication inconsistently, consult with doctors irregularly, stop taking their medication without a

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A Liquid-Liquid Extraction-Based Validation Method for the Quantification of Levetriracetam in Human Plasma

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Abstract:

Levetiracetam in human plasma was quantified using a simple, sensitive, and fast high performance liquid chromatography approach with UV detection (215 nm). An isocratic mobile phase consisting of a mixture of buffer (5mM Di-Potassium hydrogen phosphate anhydrous, pH7.2): Methanol (85:15 v/v) on a reverse phase C-8 Kromasil column was used to separate the analyte and internal standard (Zonisamide) after a single-step liquid-liquid extraction with diethyl ether/dichloromethane (70/30 v/v). An absolute standard deviation below 20% and a quantization cutoff of 1µg/mL were required. An established linear range was found to be between 1µg/mL and 40µg/mL. The validated HPLC technique achieved between-batch accuracy of 5.6-8.9% and within-batch precision of 3.9-5.3%. The accuracy ranged from 99.9 to 106.3% across batches, and from 96.1 to 102.0% within them. Medications given at the same time usually had no effect on the procedures outlined. Levetiracetam exhibited >90% plasma stability, with no signs of deterioration throughout autosampler sample processing or 60 days of freezer storage. This approach has been tested and shown to be both sensitive and easy to use in pharmacokinetic research, and it has a between-batch accuracy of less than 10%.

INTRODUCTION:

Levetiracetam (Keppra) is a novel antiepileptic drug recently approved by the U.S. Food and Drug Administration as an add-on therapy in the treatment of partial onset seizures in patients. It is structurally and mechanistically dissimilar to other antiepileptic drugs1. Its pharmacokinetic profile is linear with respect to dosage, its bioavailability is close to 100%, it undergoes only insignificant hepatic metabolism to inactive metabolites, it does not induce hepatic enzymes and about 91% of the dose is excreted via the renal route2. Therefore, it is close to a drug with ideal pharmacokinetic properties. Nevertheless, it is recommended to monitor the plasma concentrations of levetiracetam to optimize the therapeutic effect, especially in patients with renal impairment, in the elderly where the half-life of the drug is extended3 and in children, where the half-life is shortened4, 5. Till date, no simple HPLC method has been reported for levetiracetam quantitation in plasma there are only a few papers published reporting therapeutic drug monitoring methods of levetiracetam. Two methods were using GC with NPD-detection6-8. Microemulsio electro kinetic chromatography with UV-detection was utilized in one method9, but it lacks suitable sensitivity.

Two methods facilitating chiral separation of the S- and R enantiomers of levetiracetam, one utilizing GC–MS and the other HPLC–UV, were published recently10,11. These methods were designed to investigate in dogs the pharmacokinetic and pharmacodynamic properties of the two enantiomers separately. For routine therapeutic drug monitoring in men, these methods were not appropriate. All published HPLC-methods used reversed phase stationary phases. Because of the very polar nature of levetiracetam, a reasonable retention was only achieved with very low fractions of organic modifiers in the mobile phase. A sensitive analytical method is necessary for quantitation of the concentrations of levetiracetam in human plasma in order to support pharmacokinetic and bioequivalence studies. We here present a method for the routine quantification of the novel antiepileptic drug levetiracetam in human plasma by HPLC–UV. The procedure is very easy, quick, inexpensive and rugged

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Origanum × symes Carlström is a newly formed hybrid of the Lamiaceae family's origanum genus

Chaitanya prasad, Momina Fathima, O.Sruthi,Pasaladhi umesh

ABSTRACT

The Aegean Island of Symi in the Dodecanese, Greece, is where Carlström first identified Origanum × symes in 1984 as a new species. In this study, fresh evidence is presented to support a taxonomic reassessment of O. symes.

The first author gathered new Origanum symes specimens in 2017 while visiting the island of Symi.

The specimens were analyzed and contrasted with the O. symes type specimen with great care. In addition, the calyces of the new Origanum symes species were drawn and compared morphologically with those of O. calcaratum and O. onites, two potential parents.

Findings: Morphological comparisons were made between the novel hybrid and its presumed progenitors, Origanum calcaratum and O. onites. Details, images, and a map of its distribution were included, in addition to its diagnostic characteristics.

O. symes, as a result of comparing its leaves, calyx, and corolla to those of its two parents, exhibits a hybrid trait. Based on these findings, we propose that O. symes is a hybrid. The outcome was that Origanum × symes Carlström was rearranged as a hybrid of O. calcaratum and O. onites.

Topics covered: hybrid, Origanum symes, Symi, Dodecanese

INTRODUCTION

The novel hybrid reported here is one of around 42 species (49 taxa) and 22 hybrids within the Origanum L. (Dirmenci et al., 2021). The family Origanaceae is subfamily Nepetoideae and the tribe Mentheae is subtribe Menthinae. Turkiye is a hotspot of Origanum diversity, with 21 species (24 taxa, 13 endemic) and 13 hybrids (12 endemics) (Ietswaart, 1980, 1982; Harley, 2004; Dirmenci, Yazıcı, Özcan, Çelenk, & Martin, 2018; Dirmenci, Özcan, Yazıcı, Arabacı, & Martin, 2018; Dirmenci et al., 2019; Arabaci, Dirmenci, & Yildiz, 2020; Dirmenci, Özcan, Arabacı, Çelenk, & Martin, 2020; Arabaci et al., 2021; Dirmenci et al., 2021). Three hybrids, O. × intercedens Rech.f. (1961: 395), O. × minoanum P.H. Davis (1953: 137) (endemic), and the newly-discovered endemic O. × symes, are among the nine species of Origanum found in Greece. Six of these species are endemic.

Rechinger (1944, 1961), Davis (1953), Ietswaart (1980), Carlström (1984: 19), Kokkini & Vokou (1993), and Dimopoulos, Raus, & Strid (2018) are also cited. Many members of the Lamiaceae family engage in hybridization, both in nature and in culture. This is particularly true among the Origanum, Phlomis, Thymus, Salvia, and Sideritis genera (Celep, Rader & Drew, 2020; Dirmenci et al., 2021; Dadandi & Duman, 2003). According to many studies (Ietswaart, 1980; Dirmenci et al., 2019, 2020, 2021). Origanum hybridization may occur even across species from different segments.

Greek researchers doing a reevaluation of the Origanum genus found that O. symes has characteristics with both O. calcaratum Juss. (1789: 115) and O. onites L. (1753: 590). Two chromosomes, or 2n=30, are shared by both taxa.

According to Arabaci et al. (2021) and Martin, Dirmenci, Arabaci, Yazıcı, and Özcan (2020), the majority of Origanum species exhibit this form of diploidy. However, there are a few situations where the chromosomal number

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A Hydrogel Peel-Off Mask Formulated with Phyto-Nanoemulsion Incorporating Tea Leaves Extract: Design, Antioxidant Evaluation, and Ex-Vivo Transport Investigation

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Abstract

Background: Developing anti-aging cosmetic formulations might benefit from the extraordinary antioxidant chemicals found in tea leaves. The putative antioxidant chemicals' penetrability was its biggest problem, however, because of its hydrophilicity. An option for improving the penetration of chemicals that are soluble in water is the nanoemulsion formulation. This experiment aimed to create and construct a nanoemulsion formulation that incorporates tea leaf extract into a peel-off mask. It also included an ex-vivo transport research.

Methods: The process of self-nano emulsification was used to generate the nanoemulsion formulation. The optimum formulation was defined using quality target product characteristics, and the optimization procedure was carried out utilizing a design of experiment. The lyophilized extract of the cooked water-based green tea leaf (DGTE) was obtained. Additional evaluations included phenolic content and antioxidant tests. A hydrogel-based peel-off mask was created using the improved formulation. In this experiment, we used both deposited polyphenols in the skin membrane and polyphenols that permeated the skin membrane of rats.

Findings: DGTE included potent antioxidants with an IC50 value below 15 mg/mL, according to the data. Droplet size smaller than 50 nm was achieved by the optimized nanoemulsion, which consisted of 21.62% virgin coconut oil, 48.38% Tween 80, and 30% PEG 400. After around 30 minutes of drying, the peel-off formulation was ready to use, together with PVA (10-11% and HPMC 0.25-1%). The nanoemulgel peel-off mask formulation significantly improved the percutaneous transport utilizing rat skin membrane for about 208% and 50%, respectively, in terms of permeability and deposition.

Results: DGTE polyphenol chemicals were better able to penetrate when a hydrogel-based peel-off mask with nanoemulsion was used.

Introduction

Skin aging is one of the most problematic issues that requires particular consideration.1 Several factors have been identified, for example, ultraviolet (UV) from sunlight, high temperature, lifestyle, pollution, and genetics, which induce skin aging.2 Particularly in tropical urban cities, high intensity of sunlight will exacerbate this issue.3,4 Furthermore, the UV generates free radicals and promotes reactive oxygen species (ROS) production. Our body can neutralize ROS through endogen antioxidants. However, an excessive amount of ROS increases the oxidative stress level; hence, it degrades collagen and reduces its production. This phenomenon is the leading cause of skin aging.1,2 Therefore, the skin requires potent antioxidant compounds that could break up that phenomenon. Antioxidant compounds, for instance, polyphenol bioactive compounds in tea leaves, have potent activity for radical scavenging.5,6 They can inhibit ROS formation and maintain collagen and its production. Not only polyphenols but also flavonoids are considered to have the powerful capability for avoiding the formation of ROS.7 Tea leaves contain polyphenols and catechin derivates, namely catechin, epigallocatechin gallate, gallocatechin, and epicatechin, which play a fundamental role in antioxidant properties. In addition, they also contain flavonoid compounds such as quercetin glycoside and flavanols derivates.6 The remarkable antioxidant is proven *in-vitro*, but it generally lacks activity when applied percutaneously.8 Due to their size and hydrophilicity, they have challenges permeating the skin and reaching the collagen tissue. A sizeable molecular size is not easy to transport; meanwhile, the abundance of hydroxyl groups promotes a hurdle, i.e., pass through the skin membrane, particularly the stratum corneum, the hydrophobic first barrier in

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New Paclitaxel Nanoemulsion Containing Surface Modified Carvacrol from Satureja khuzestanica: Inducing Cell Death in Paclitaxel-Resistant Breast Cancer Cells

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Abstract

Background: A significant obstacle in contemporary chemotherapy is the capacity of cancer cells to acquire multidrug resistance (MDR). To far, there has been no effort to develop paclitaxel formulations that are capable of treating tumors that have developed resistance. This research aimed to improve the effectiveness of paclitaxel against breast cancer cells that had gained resistance by developing a delivery mechanism that relied on nanoemulsions.

Methods: The nanoemulsion was created by using the essential oil of Satureja khuzestanica, which is high in carvacrol. Tocopheryl polyethylene glycol 1000 succinate (TPGS), which may reduce cancer cell drug resistance, was added to the nanoemulsion as a modification. Use of high-speed homogenization allowed for the fabrication of paclitaxel nanoemulsion. The MTT test was used to examine the cytotoxicity of the formulation against resistant breast cancer cells. The cell cycle arrest analysis and apoptosis induction capacity of the produced nanoemulsion were conducted using the flow cytometry method.

The results showed that the nanoemulsion was stable over the long period and had a modest average droplet diameter of 93.6 ± 4.2 nm. The administration of paclitaxel inside the nanoemulsion synergistically improved its capacity to inhibit P-gp activity in paclitaxel-resistant breast cancer cells (MCF-7/PTX). Compared to MCF-7/PTX cells, the cytotoxicity of the produced nanoemulsion was much reduced on HUVEC normal cells. Flow cytometry-based cell cycle analysis revealed that the nanoemulsion containing paclitaxel enhanced G2-M arrest. This nanoemulsion caused MCF-7/PTX cells to undergo apoptosis, as shown by flow cytometry. It is worth noting that the percentage of cells undergoing cell death rose from 20.0% in the group treated with free paclitaxel to 85.2% in the group treated with paclitaxel-loaded nanoemulsion.

In conclusion, our new paclitaxel nanoemulsion effectively caused apoptosis in breast cancer cells at very low paclitaxel concentrations while simultaneously suppressing drug resistance.

Introduction

Paclitaxel is a potent antineoplastic drug widely used to treat various cancers such as breast, lung, and ovarian cancers.1,2 However, in many cases, the efficiency of chemotherapy is compromised due to the establishment of multidrug resistance (MDR) in cancerous cells.3,4 A common reason for paclitaxel resistance in cancer cells is the overexpression of P-glycoprotein, a drug efflux pump.5 P-glycoprotein (P-gp) is a well-known member of the ATP-binding cassette (ABC) proteins, which pumps paclitaxel out of cancer cells via an ATP-dependent mechanism.6,7 It has been suggested that P-glycoprotein inhibitors, such as verapamil, quinine, and cyclosporine A, could increase the efficiency of paclitaxel as a chemotherapeutic agent in MDR cancer cells. However, the application of these compounds is

currently limited due to undesirable pharmacokinetic interactions and side effects.8,9 Several commercial formulations have been developed to enhance the solubility characteristics of paclitaxel for clinical applications. Taxol® is a well-known formulation of paclitaxel comprising polyethoxylated castor oil (Cremophor EL) as a solubilizing agent. Taxol chemotherapy often results in severe side-effects due to Cremophor EL, including hypersensitivity reactions, hyperlipidemia, aggregation of erythrocytes, abnormal lipoprotein patterns, and peripheral neuropathy.10,11 For this reason, alternative formulations have been developed to overcome these drawbacks, including Abraxane® (albumin-bound paclitaxel nanoparticles), Genexol®-PM (paclitaxel polyethylene glycol-polylactide (PEG-PLA) micelles), Lipusu (liposomal paclitaxel),12 and Onxol® (paclitaxel-loaded PCL-TPGS nanoparticles).13 Despite reducing undesirable side-effects, the lack of efficiency against multidrug resistance in cancer cells is still recognized as the main challenge to the clinical application of the available paclitaxel formulations.14 Nanoparticle-based delivery systems have been shown to facilitate the administration, enhance the pharmacokinetic profile, increase the therapeutic efficiency, and reduce the adverse side-effects of various drugs.15 This type of delivery system may also be effective at overcoming MDR in cancer cells, because the absorption of drug-loaded nanoparticles *via* endocytosis prevents the recognition of the drug molecules by efflux pumps.16 The internalized nanoparticles could then release the drugs close to the

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L-Proline as Co-Crystal Forming Amino Acid for Enhanced Dissolution Rate of Lamotrigine: Development of Oral Dispersible Tablet

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ABSTRACT

Oral bioavailability may be diminished by the slow dissolving rate of the antiepileptic medicine lamotrigine. Furthermore, it was observed to possess first pass metabolism. Therefore, this study set out to improve its solubility via the use of the co-crystallization approach so that it may be included in ODTs. Because of its anticonvulsant effects and ability to improve solubility, L-proline was chosen as a co-crystal co-former. The formulations were made using ethanol-assisted co-grinding and included lamotrigine and L-proline in varying molar ratios. Dissolution investigations, FTIR, XRD, and differential scanning calorimetry were used to characterize the produced formulations. Included in the rapid dissolving tablet/ODT for buccal usage was the formulation that had the greatest dissolve rate. Optimal interaction was seen in co-crystals of lamotrigine and l-proline with a molar ratio of 1:2, according to characterization methods. A molar ratio of 1:4 between lamotrigine and proline demonstrated the highest dissolving rate (% DE = 80.57), indicating that this interaction significantly improved the dissolution rate. When compared to a control tablet that just contained lamotrigine, the one that was made using a molar ratio of 1:4 and lamotrigine and L-proline had a much faster rate of disintegration and dissolving. In order to increase the rate of lamotrigine's dissolution after buccal administration, the research recommended L-proline as an effective co-crystal co-former.

Efficacy of oral dispersible tablet formulation, lamotrigine, L-proline, co-crystallization

INTRODUCTION

Lamotrigine belongs to the family of antiepileptic drugs called phenyltriazine. It is sometimes recommended for the treatment of bipolar disorder. Oral administration of lamotrigine decreases its bioavailability due to its significant hepatic first pass metabolism (Mashru et al., 2005). A change in pH is thought to affect lamotrigine's solubility. Partition coefficient suggests buccal mucosa transport might be advantageous, despite limited solubility at 6.8 pH (Patel et al., 2011; Srinija and Lakshmi, 2016). Several methods exist for increasing the rate of solubility of hydrophobic APIs, such lamotrigine. Micronization, solubilizing agent addition, inclusion complex creation, and solid dispersion with hydrophilic polymer(s) are some of the techniques that have been documented (Srikanth et al., 2010; Pankaj et al., 2011; Essa and Dwaikat, 2015). The alteration of API crystalline structure by a co-crystallization technique is another developing option that is attracting the attention of scientific experts. The API's crystal lattice structure is changed when it forms co-crystals with an inert co-former. In most cases, the intramolecular bonding in the final product is weaker than in the parent complex. By using non-covalent interactions with one or more co-formers, co-crystallization allows for the modification of APIs' physicochemical properties without compromising their pharmacological efficacy. According to Arafa et al. (2016) and Karagianni et al. (2018), this may significantly increase the pace at which drugs dissolve. Amorphization, often known as co-amorphousization, may occur during co-processing. An additional method for increasing the rate of API dissolution is the latter procedure (Dengale et al., 2016; Abdelquader et al., 2018). Several inert co-formers have been documented.

(Nalte et al., 2015; Budiman et al., 2016) Some examples of these co-formers include oxalic acid, benzoic acid, tartaric acid, and urea. Arafa et al. (2016) and 2018 found that sugars (such as sucralose and xylitol) used as co-crystal co-formers had promising outcomes. Many active pharmaceutical ingredients (APIs) use amino acids as a co-former. Because of their structural features that allow them to create hydrogen bonds with other molecules, amino acids show great promise as co-formers. The most effective amino acid used as a co-former is L-proline. Nugrahani et al. (2021) found that L-proline's co-former capacity is enhanced by charge-assisted hydrogen bonding, which allows it to create a flexible but strong association with other molecules via zwitterionic co-crystal formation. Notably, some medications, including indomethacin and acetazolamide, have been shown to have improved gastrointestinal tract permeability when supplemented with L-proline (Song et al., 2019; Wang et al., 2020). A number of medications have been studied for their ability to be more soluble when combined with L-proline as a co-crystal co-former. These pharmaceuticals include naproxen, ibuprofen, flurbiprofen, and chlorothiazide. Sarhan et al. (1989) also noted that L-proline may have anticonvulsant effects, making it a useful adjunct to antiepileptic drugs like lamotrigine.

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Investigational, Simulation, and Molecular Dynamics Analyzing the Dissolution of Codeine Phosphate in N-Methyl-2-pyrrolidone and Ethanol via Simulation

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Abstract

Background: *The prediction accuracy of typical thermodynamic models is unclear due to the limited data available for the solubility of codeine phosphate in binary systems. This research used the shake-flask technique to examine the dissolution of codeine phosphate in a system of N-methyl-2-pyrrolidone (NMP) and ethanol. The data was then mathematically explained using several thermodynamic models. In addition to the other properties, the density was calculated and fitted using the Jouyban-Acree equation. A verification of the model's correctness was accomplished by calculating the mean relative deviations. In addition, the values of* ΔH°, ΔS°, *and* ΔG° *for the codeine phosphate dissolution in the NMP and ethanol system were determined at Thm using the appropriate formulae.*

Findings: *codeine phosphate has an endothermic dissolving process; increasing the mass fraction of NMP improved its solubility in binary mixtures; and, lastly, with a mean relative deviation typically around 8%, the model predictions were considered good.*

In conclusion, *this study's findings have the potential to add to the existing codeine phosphate solubility database.*

Introduction

Codeine phosphate (Figure 1) is the opioid drug with a weak capability of binding to μ-opioid receptors. It is a compound with different clinical effects as used in pain relief, or treatment of cough and diarrhea, whereby a fraction of the dose is converted to morphine.1,2 Codeine is present in unripe seed capsules of the poppy plant.1 Therefore, its extraction from natural products plays a crucial role in the pharmaceutical and chemical industries. Liquid-liquid extraction, also known as solvent partitioning technique, is a critical separation processes in chemical engineering in which substances will separate according to solubility in two different or immiscible solvents.2 The ability to select the best solvent from a wide range of solvents and the low cost of relevant devices are the most important advantages of this process.2 Therefore, the knowledge of solubility is extremely important for the selection of the best solvent/antisolvent system. Apart from extraction purposes, there are further galenical processes that harness co-solvent mixtures as intermediate bulk solutions and, in this context, it is usually the maximum drug solubility that is targeted for further processing to obtain the final dosage form, for example, by a microprecipitation or spray-drying process. Understanding of the respective drug dissolution mechanisms is considered as crucial in chemical engineering and the pharmaceutical sciences and therefore it is vital to extend the available solubility database of pharmaceuticals for its broad spectrum usage in pharmaceutical and chemical industries.3,4 Codeine usually exists in salt form in the market. So far, only limited studies were available for the experimental solubility of codeine phosphate. The published studies include investigation of codeine phosphate in neat solvents of water and ethanol, binary organic solvents of N-methyl-2-pyrrolidone (NMP) + 2-propanol and carbitol + 2-propanol which are our previous efforts. However, there appears to be no solubility value for codeine phosphate in NMP + ethanol in database. NMP is a polar aprotic and stable solvent with high usage in the pharmaceutical industry.5-7 Furthermore, ethanol is

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