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THESIS

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Risks and adverse effects of self medication in Algeria

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Dedication

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Dedication

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List of Acronyms

WHO: According to the World Health Organization

EC: European Community

MOP: medicines with optional prescription

MMP: medicines with mandatory prescription

ARF: acute renal failure

GC: glucocorticoid

ASA: acetylsalicylic acid

SAL: salicylic acid

CNS: Central nervous system

DNA: Deoxyribonucleic acid

IOM: Institute of medicine

VDI: Vitamin D intoxication

25OHD: 25-hydroxyvitamin D

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Introduction

The practice of self-medication, where individuals treat their own health conditions without professional guidance, has become increasingly common in Algeria. However, this trend is accompanied by various risks and adverse effects. This thesis aims to investigate the potential hazards associated with self-medication in Algeria and shed light on the importance of responsible medication use. The study is divided into two parts: a theoretical part and a practical part.

The theoretical part consists of three chapters. The first chapter focuses on understanding the fundamental concepts of medication and prescription. The second chapter provides a detailed definition of self-medication and explores the reasons why individuals engage in this practice, including convenience, cost-effectiveness, and limited access to healthcare services. It also examines the etiological factors contributing to the prevalence of self-medication and discusses the consequences and risks associated with it. The third chapter delves into specific drugs and vitamins commonly used in self-medication practices in Algeria, analyzing their adverse effects and potential toxicity. It also addresses the issue of antibiotic resistance and discusses the risks associated with excessive use of certain vitamins and minerals.

In the practical part of the study, a questionnaire-based survey is conducted among the general population and pharmacists in Algeria. The collected data is analyzed and presented, providing insights into the prevalence and patterns of self-medication practices in the country. The study concludes with proposed solutions to promote responsible medication use and mitigate the risks associated with self-medication. These recommendations aim to improve public health outcomes in Algeria by raising awareness about the dangers of self-medication and advocating for more informed and responsible healthcare practices.

In summary, this thesis provides a comprehensive examination of the risks and adverse effects of self-medication in Algeria. By combining theoretical analysis and practical research, it offers valuable insights into this concerning practice and proposes measures to enhance patient safety and wellbeing. The general conclusion will summarize the main findings of the study and present recommendations for future actions and interventions in addressing the risks of self-medication in Algeria.

The objectives

The main objective of our work is to evaluate the frequency of self-medication and its consequences in the Algeria. Specifically, the study aims to:

- Determine the causes of self-medication and identify the key actors involved.
- Identify the complications associated with self-medication.
- Determine the relationship between self-medication, gender, age, level of education, chronic diseases, and other relevant parameters.
- To propose solutions and recommendations to promote responsible medication use and mitigate the risks associated with self-medication in Algeria.
- To contribute to the improvement of public health outcomes by raising awareness about the risks of self-medication and advocating for informed and responsible healthcare practices in Algeria.

By addressing these objectives, we aim to provide insights into the extent of self-medication practices in Algeria and contribute to understanding the associated risks and consequences.

Theoretical part:

Chapter one:
Medication

1. History of Medication:

The discovery of new medications was long limited to the empirical observation of the effects produced by certain natural substances on the course of diseases. It was Paracelsus in the 16th century who advocated the necessity of a specific medication for each disease. With the discovery of the New World, explorers brought back significant active ingredients such as quinine, ipecacuanha, coca, coffee, etc. [1]

Thanks to advancements in chemistry and physiology, the 20th century marked a new milestone with the isolation of active ingredients: morphine and codeine were extracted from opium, emetine from ipecacuanha, quinine from cinchona bark. Colchicine replaced colchicum, and acetylsalicylic acid replaced willow bark. Subsequently, papaverine was derived from poppy, digitalin from foxglove, and ergotamine from rye ergot. Aspirin was synthesized in 1897 by Hoffman. [1]

At the beginning of the 20th century, novocaine was introduced in 1901, synthetic antisyphilitics in 1906, and synthetic antimalarials in 1927. However, the modern era began with the discovery in 1937 of the antibacterial action of sulfonamides. In 1943, Fleming discovered penicillin, and in 1947, streptomycin, which proved effective against tuberculosis. [1]

2. Definitions of Medications:

The medication according to different regulations:

2.1. According to the World Health Organization (WHO):

"Any substance that is part of a pharmaceutical product and is intended to modify or explore a physiological system or a pathological condition for the benefit of the recipient." [2]

2.2. According to Article 170 of Algerian Law No. 13-08 of July 20, 2008:

"Medication, as defined by this law, refers to any substance or composition presented as having therapeutic or preventive properties for human or animal diseases, and any products that can be administered to humans or animals for the purpose of establishing a medical diagnosis or restoring, correcting, and modifying their organic functions." [3]

3. Definition of Medication Prescription:

Prescription is generally defined as a "formal and detailed order listing what needs to be done" [4] or a "command, precept," or a "rule to be followed."[5]

In medical terms, it refers to a "therapeutic recommendation, potentially recorded on a prescription, made by a physician," which can also refer metonymically to "the written document in which what is prescribed by the physician is recorded." [4]

Prescribing in medicine is the act of "giving advice, giving orders, strongly recommending care or a certain treatment to a patient. [5]

" Etymologically, "prescribe" is derived from the Latin verb "praescribere," from "prae-" meaning "before, in front of," and "scriber" meaning "to write," thus signifying "to write at the top, mention in advance, highlight; indicate, determine, prescribe." [5]

In the current regulatory context, there are only two possible statuses for pharmaceutical specialties based on the necessity of medical prescription or not. [5]

3.1. Prescription:

Prescription can be oral, but most often takes the form of a written document called a medical prescription. [6]

In order to be honored by the pharmacist, the prescription must comply with certain rules. The following information must be included, among others: [7] [8]

- Identification of the prescriber (name, professional title, qualification, or specialty, and their identifier if applicable).
- Date of prescription.
- Signature of the prescriber.
- Name of the prescribed medication or product, or the active ingredient designated by its generic name, dosage instructions, and if it is a preparation, the detailed formula.
- Duration of treatment or number of dosage units, and, if applicable, the number of prescription renewals.
- Patient's name, first name, gender, and age (weight should be specified for young children, and height and weight are necessary for calculating body surface area).
- Optional prohibition of renewal.

"The prescriber must place their signature immediately below the last line of the prescription or render the space between the last line and their signature unusable by any appropriate means." For narcotics, all numerical data must be expressed in words (e.g., dosage, strength, duration, number of units, etc.). [7]

There are several types of prescriptions: regular prescriptions, secure prescriptions (mandatory for prescribing narcotics), and "bizone" prescriptions for specific medications covered by insurance. [7]

The prescription may include other prescriptions besides medications, such as nursing care, paramedical treatments, additional examinations, hospitalizations, transportation, etc. It may also include dietary recommendations, hygiene advice, and, in general, anything that can contribute to the understanding and proper follow-up of the treatment. [7]

The prescription must be established after an examination of the patient. It should be explained and commented on to the patient or, if applicable, to their caregiver. The prescription is the property of the patient. [6]

The prescription holds the prescriber's responsibility. The advantage of a written document is that it is not dependent on the patient's memory. However, it is all the more important for it to be clear and precise. [6]

3.2. Prescribers:

The prescription can be written by a physician, a dentist for dental purposes, a veterinarian for veterinary medicine, a midwife, or the director of a medical biology analysis laboratory, within the limits provided by the authorities for the latter two cases. [7]

3.3. Recipients:

The prescription is intended for: [6]

- The patient, who keeps the original.
- The pharmacist for dispensing the medications, who keeps a copy (3 years for narcotics).
- Social security organizations, who may receive a copy for direct reimbursement of the patient or the pharmacist (third-party payment).

4. Prescription-only Medications

Prescription-only medications are listed on a specific list. Pharmacists can only dispense them with a prescription. These medications are packaged in boxes labeled "prescription-only" with a green or red border. [9]

4.1. Listed Medications

This category includes medications containing one or more poisonous substances.

Article 244 states that poisonous substances, as defined by this law, include: [9]

- Narcotic substances
- Psychotropic substances
- Substances listed on List I and List II of substances, preparations, and products presenting risks to health, in accordance with international classification.

Article245. states that the production, manufacturing, packaging, transformation, importation, exportation, offering, distribution, transfer, acquisition, possession of substances and medications with narcotic and/or psychotropic properties are subject to specific administrative, technical, and security controls. The use of plants or plant parts with narcotic and/or psychotropic properties is also subject to control. [9]

The implementation of this article is determined by regulatory measures.

These medications are classified as follows: [9]

- List I medications, formerly known as "toxic" or Table A, have strong toxicity. They can cause toxic or serious undesirable effects depending on the dosage. Their administration requires medical monitoring.
- List II medications, formerly known as "dangerous" or Table C, have lower toxicity. Their administration can tolerate less stringent medical monitoring. The risks of toxic or serious undesirable effects are lower.

4.2. Narcotics (formerly Table B)

Narcotics are substances that can lead to drug addiction. This list of narcotics may be supplemented by national authorities. Any production, manufacturing, trade, possession, or

use is prohibited unless specifically authorized, particularly for pharmaceutical purposes. Any medication containing these substances is subject to narcotics regulations. [9]

Article 33 prohibits pharmacists from renewing any prescription for substances on Table B.

4.3. Psychotropics

Psychotropics are substances that act on the psyche. They are subject to special regulations regarding their manufacturing, trade, possession, and use to prevent misuse and illegal trafficking. [9]

5. Medicines with Optional Prescription

According to European regulations (Directive 2004/27/EC, Article 72), medicines with optional prescription (MOP) are all medicines that do not meet the criteria for medicines with mandatory prescription (MMP) and are therefore not listed in any medication list (List I, List II). [9]

These medicines fulfill the following criteria: [9]

- They do not present any direct or indirect dangers associated with the active substance they contain, at recommended therapeutic doses, even if they are used without medical supervision. Some medicines have indications suitable for self-use by the patient, with possible advice from the pharmacist at the time of purchase. This means that the condition being treated does not necessarily require an initial medical diagnosis or regular medical monitoring of the treatment.

For other medicines, their current MOP status is due to the fact that the active substances they contain have demonstrated their safety at recommended therapeutic doses. However, they have indications for which medical advice would be preferable, at least during the initial use, especially for establishing a diagnosis, conducting an assessment, or determining the optimal dosage for a patient. [9]

These unlisted medicines are classified as follows: [9]

5.1. Over-the-counter medicines:

Medicines delivered without prescription, not listed, directly recommended at the pharmacy, available for purchase without a prescription following "therapeutic advice at the pharmacy."

5.2. Consumer medicines:

Medicines benefiting from mass media advertising such as television and press, and therefore often requested by users

Art. 237: Advertising for pharmaceutical products targeting healthcare professionals consists of any activity promoting the prescription and dispensing of pharmaceutical products. It requires prior authorization from the national agency for pharmaceutical products and can only be carried out for duly registered pharmaceutical products.

Advertising must not be misleading or compromise public health protection. It should present the medicine or product objectively and promote its appropriate use.

It must comply with the registration decision and therapeutic strategies recommended by the Ministry of Health. Advertising for a medicine is prohibited when the benefit-risk ratio is under reassessment. Healthcare professionals must be informed by the marketing authorization holder of the reassessment conducted under this provision. The information provided must be consistent with that delivered by the national agency for pharmaceutical products.

Advertising for pharmaceutical products and promotion targeting the public is prohibited regardless of the means of communication used.

Medical samples for advertising and promotion purposes are prohibited.

Art. 238: Scientific information and advertising for pharmaceutical products are conducted by pharmaceutical manufacturers and specialized companies involved in medical promotion under Algerian law. Scientific information and advertising for pharmaceutical products are subject to authorization from the Ministry of Health.

Art. 239: Scientific information and advertising for pharmaceutical products and medicines, for non-promotional purposes, may also be conducted by: public institutions related to public health, training, and scientific research in the health field when public health imperatives require it; scientific associations for their training activities; social associations, including consumer protection associations, for health education activities.

Art. 240: Advertising for pharmaceutical products not subject to mandatory prescription is allowed targeting healthcare professionals. It is subject to technical approval by the services of the Ministry of Health, which determines the list of these products. [9]

Chapter two:

Self-medication

1. The history of self-medication:

Self-medication is not a recent practice. Since ancient times, individuals have self-medicated without waiting for prescriptions from officially certified doctors. Faced with symptoms considered both trivial and significant, patients acted as their own therapists. [10]

In the search for sustenance using primitive means, humans tried everything: plants, animals, and mineral products to survive. Over time, they learned that these sources provided a range of products to alleviate illness and pain. Since then, they have often but not always rationally used various substances, typically of plant origin, to treat themselves. Consequently, a considerable number of raw "active principles" accumulated within cultural heritages worldwide. [10]

This custom expanded and became codified thanks to people who started gathering available information on preparations of these raw active principles for self-medication. The very first codification was found in an astonishing medical papyrus dating back over 2000 years in Egypt. The great Albert is, in a way, a compilation containing over 900 prescriptions of various raw materials derived from animals, plants, or minerals to treat a range of symptoms. More extensive compilations were also made in India and China [11].

Before the 2000s, the medical profession considered self-medication harmful, fearing delays in diagnosis and treatment, potential disruption of examinations, masking of underlying pathologies, dosage errors, and drug interactions. These concerns and reservations are still entirely justified if self-medication involves self-diagnosis and self-treatment [12].

Currently, self-medication has become the norm, with the vast majority of people resorting to it, often without even realizing that taking a paracetamol tablet is one of its practices. [12].

2. Etymology:

Self-medication is a compound word composed of two syllables: "Self" and "Medication."

- Self: means for oneself. Although self-medication often applies to other individuals, such as one's children, spouse, or close circle. What is considered medication for oneself may not be the same for others, as what one knows about oneself intimately may not be known for another person who is not oneself. The act of self-medication is a voluntary, individual, and responsible action, with the exception of children, as parents are responsible for their well-being and must act on their behalf.

- Medication: refers to the use of medication [12].

3. Definitions:

Self-medication: In its strict sense, the term "self-medication" refers to the use of medicines without a prescription [13]. The same concept is derived from the definition provided by the World Health Organization: "Self-medication is the selection and use of medicines by individuals to treat self-recognized illness or symptoms"[10].In this case, the individual diagnoses their own illness, usually mild and common, and in the absence of immediate medical advice, they establish their own prescription by choosing the medication, dosage, and treatment technique without direct medical consultation. [10]

4. Steps of Self-Medication:

The behavior of self-medication is based on two distinct steps: self-diagnosis and the choice of medication. **Figure1** [14]

4.1. Self-Diagnosis:

Self-medication is a behavior that arises when there is an imbalance in an individual's health status. In this case, the individual personally seeks to identify the symptoms that are affecting them. This is the first step of the self-medication process known as "Self-Diagnosis."

The patient has access to a considerable arsenal of information. Firstly, they can rely on their own knowledge and "medical culture" that they have developed throughout their life. Their education, environment, and medical events that have affected them or their close ones contribute to their scientific knowledge.

Additionally, individuals now have increasingly easy access to medical information through the internet, specialized print journals, and health-related television programs.

The relevance of self-diagnosis can vary from one individual to another and depends on their personal history and environment [14].

4.2. Choice of Medication:

After identifying the symptoms or the condition that is affecting them and evaluating its severity, the individual faces several situations.

In the first scenario, they are unaware of what they have. In this case, they self-assess the severity of the situation. If they consider the problem to be serious, they will naturally seek a doctor's advice. Alternatively, if they perceive the problem as less severe, they may tend to consult their community pharmacist.

In the second scenario, the individual knows (or believes they know) what they have. They then choose a medication to address the issue. They may find the medication in their own medicine cabinet or that of their surroundings (previously prescribed but unused medication, or medication prescribed with the instruction "in case of..."), or they may obtain it from a pharmacy [14].

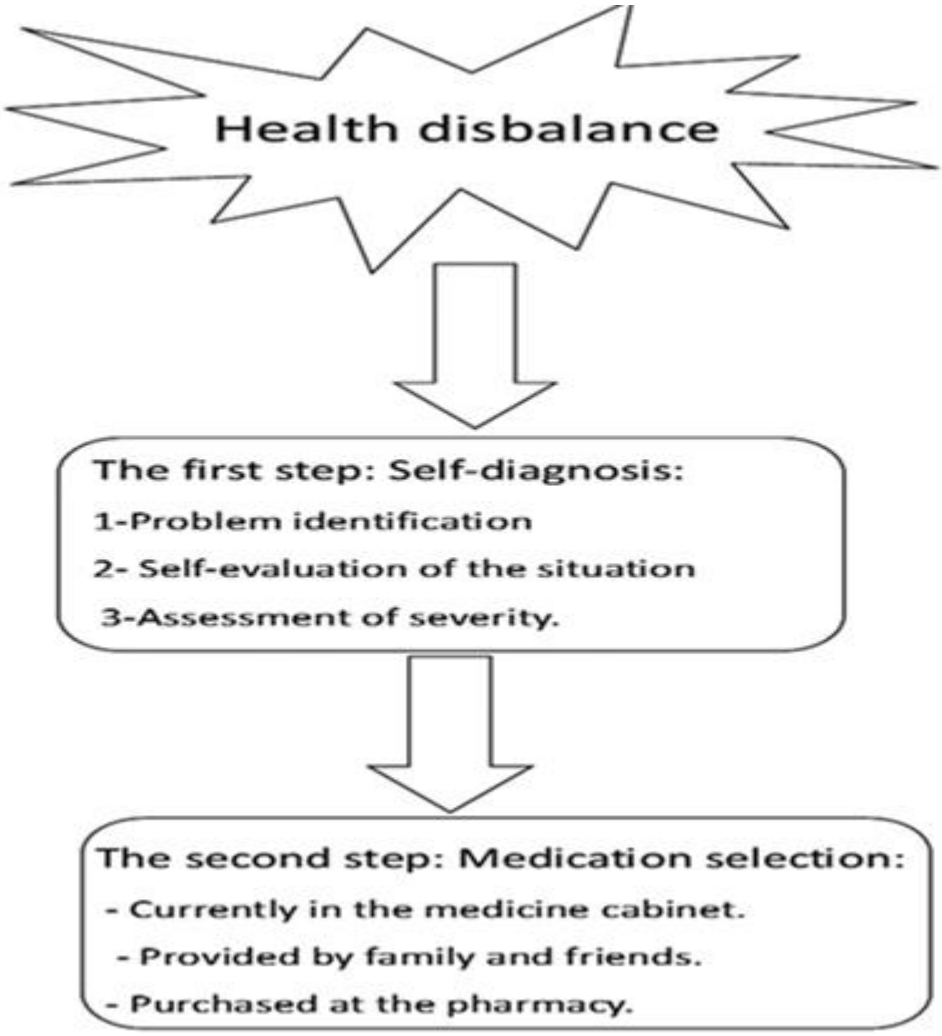

Figure1: steps of self-medication done by student [14].

5. The reasons for self-medication

The reasons for self-medication are based on the consumer's knowledge, which will determine the success of appropriate self-medication. This knowledge is acquired through various sources, not all of which have the same level of conviction, truthfulness, or safety. These sources include: **Figure 02** [15].

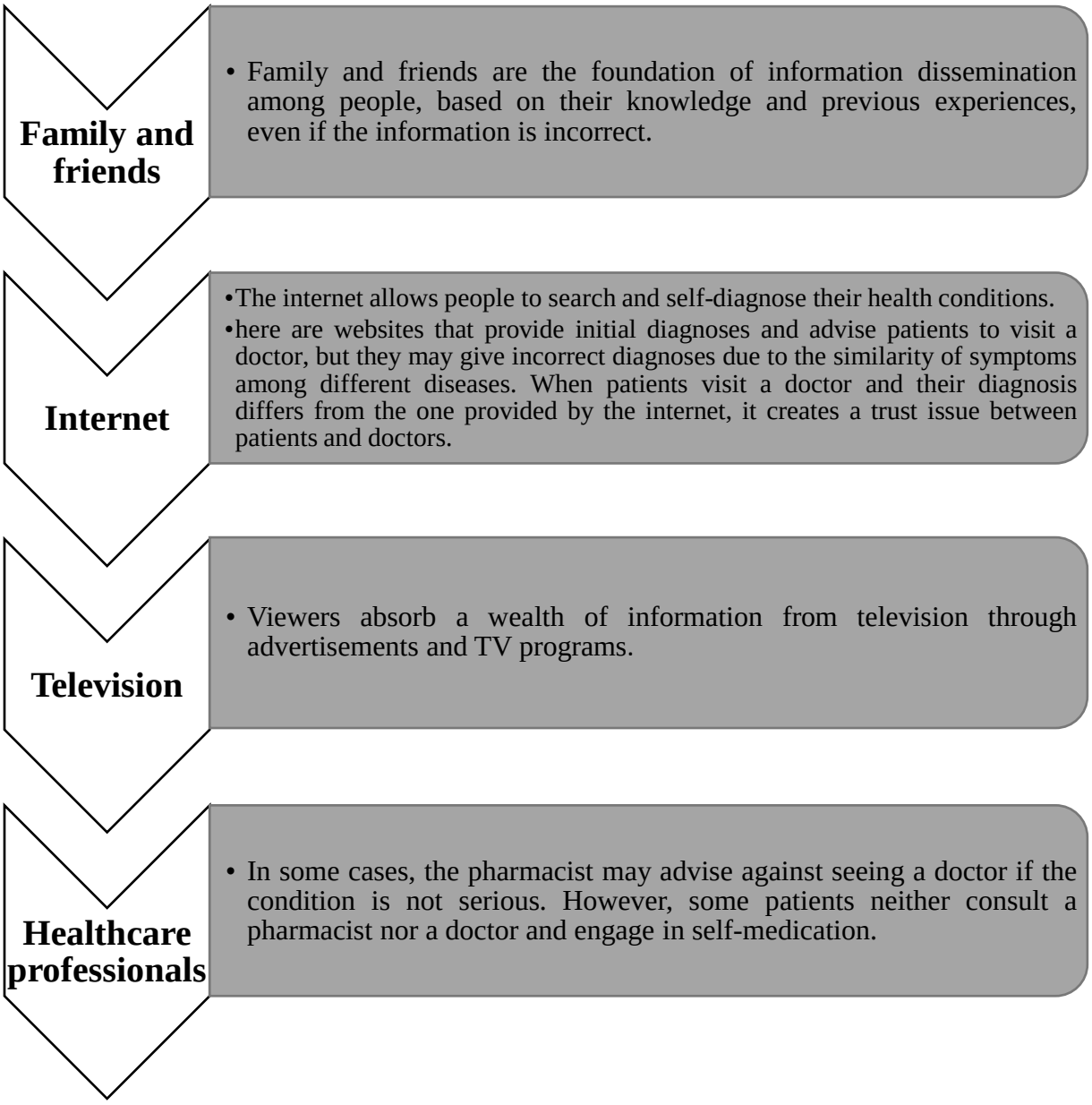

Figure 02: the raisons of self medication done by students [15].

6. Etiological factors of self-medication

The factors that drive patients to self-treat are diverse in nature. The reasons that are essential for understanding self-medication are as follows: **Figure 3** [15].

Figure 3: Etiological factors of self-medication done by student [15].

7. Consequences of self-medication

7.1. Risks of self-medication

The risks of self-medication are explained in the following table [15].

Table 1: Risks of self-medication done by student [15].

Risks	Explanation
Patient-related risks	Newborns: Weakness of metabolic and immune systems, organ immaturity, risk of overdose. Elderly: Decreased metabolic and/or renal elimination activity, risk of medication accumulation and toxicity. Pregnancy and breastfeeding: Risk of teratogenic or fetal-toxic effects of certain treatments.
Diagnostic risks	Symptomatic effect: Medications may provide temporary relief but not address underlying cause. Delayed diagnosis: Serious underlying diseases may be missed, leading to delayed treatment.
Medication-related risks	Inappropriate medication choice: Patients may seek specific medications without proper indication. Pharmacist's role: Pharmacists can inquire about reasons for medication purchase to ensure appropriateness.

7.2. Risky situations:

The risky situations of self-medication are explained in the following table **Table 2** [15].

Table 2: Risky Situations of Self-Medication done by student [15].

Risks	Explanation
Serious adverse effects	Primary pharmacodynamic effects: e.g., bleeding in patients with thrombosis on anticoagulant treatment. Secondary pharmacodynamic effects: e.g., destruction of intestinal flora from high-dose, prolonged use of broad-spectrum antibiotics. Effects prominent in certain patients: e.g., quinine-induced itching, drowsiness from antihistamines
Drug interactions	Modifications of medication effects caused by simultaneous or previous administration of another medication. Consequences: exacerbation of adverse effects or ineffectiveness of treatment.
Medication poisoning	Accidental ingestion of large medication doses or as a result of a suicide attempt. Consumption of toxic or deteriorated medications. Risk and consequences depend on quantity and nature of products
Drug dependence and addiction	Psychological and sometimes physical state leading to compulsion to continuously or periodically take a substance. Tolerance may or may not be present. Opioids are particularly dangerous, but other medications can also lead to dependence
Antibiotic resistance	Decreased effectiveness of specific

	medications due to excessive, uncontrolled, or insufficient use
Poor management of medicine cabinet and family medications	Risks of medication resistance, expired medications, impairment of alertness, and drug potentiation.
Medication abuse	Intentional, excessive use of medications or products leading to harmful physical or psychological reactions.
Non-compliance with treatment and prescriptions	Lack of adherence to healthcare professional's recommendations, including medication, hygiene, and dietary rules. Different levels of non-compliance exist, ranging from not visiting the pharmacist to modifying dosage or timing

8. Actors of self-medication and responsibility

The Actors of self-medication and responsibility are explained in the following table [16].

Table 3: Actors of self-medication and responsibility done by student [16].

Actors	Responsibility
Pharmacist	Provide support and advice Participate in patient education Ensure medication safety Verify proper use of medications Direct patients to a doctor when necessary Be available and attentive to patients Collaborate with doctors for appropriate medication use Counter the problem of unqualified salespersons in pharmacies
Doctor	Explain risks of uncontrolled treatment

	Emphasize adverse effects and serious side effects of medications Stress the importance of following prescribed dosage Consider non-lifestyle causes of symptoms Discourage prescribing treatment to others Encourage patients to inform healthcare providers about medications Promote proper medication use
Individual (Patient)	Take responsibility for personal medication use Pay attention to vulnerable groups (children, elderly, pregnant women) Identify symptoms or illness Ensure appropriateness of self-medication Choose suitable medication Follow instructions on labels and package inserts
Public Authorities	Recognize importance of self-medication Distinguish between prescription drugs and over-the-counter medications Inform and protect individuals engaging in self-medication Ensure safety and prevent long-term negative consequences

Chapter three:

Risks and adverse effects of self medication

1. Common drugs used in self-medication

1.1. Acetaminophen

ACETAMINOPHEN (paracetamol, N-acetyl-Para-aminophenol) is commonly used as a mild analgesic and antipyretic. Alone or in combination with other drugs, it is found in more than 200 formulations promoted for symptomatic relief of pain, cough, and colds) [17].

1.1.1. Adverse effect

The adverse effects are outlined in the following section **Figure4 [18].**

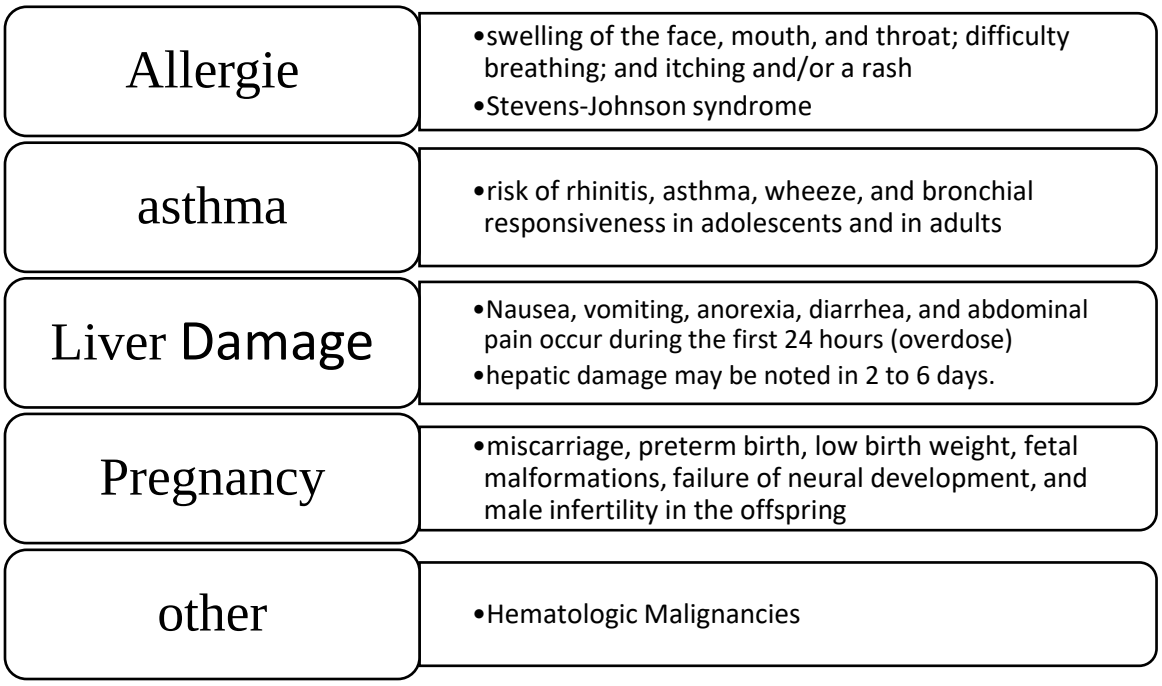

Figure 4: The adverse effect of Acetaminophen done by students **[18].**

1.1.2. Toxicity

The clinical signs usually do not become apparent for the first 24-48 hours after an acute overdose of paracetamol [19]. Liver failure may occur between 2-7 days following the ingestion. The clinical course of paracetamol toxicity is generally divided into 4 phases [20].

Table 4 [21]

Table 4: clinical stage of acetaminophen toxicity done by students **[21]**

stage	Time	Symptoms
Phase 1	**(0-24 h)**	Patient asymptomatic or reports anorexia , nausea or vomiting , malaise
Phase 2	**(18-72 h)**	Anorexia, nausea, and vomiting and right-upper-quadrant abdominal pain. Tachycardia and hypotension may indicate volume losses
Phase 3	**(72-96 h)**	Continued nausea and vomiting, abdominal pain, and tender, painful liver. Hepatic problem may manifest as jaundice, coagulopathy, hypoglycemia, and hepatic encephalopathy. ARF develops in some critically ill patients death may occur
Phase 4	**(4 days -3 weeks)**	Upon survival of critical illness in stage 3. complete resolution of symptoms and complete resolution of organ failure

1.2. Corticosteroids

Since their discovery, corticosteroids have been used in almost all areas of medicine and by nearly every route [22].Corticosteroids are synthetic analogues of the natural steroid hormones produced by the adrenal cortex. Like the natural hormones, these synthetic compounds have glucocorticoid (GC) and/or mineralocorticoid properties.

Mineralocorticoids affect ion transport in the epithelial cells of the renal tubules and are primarily involved in the regulation of electrolyte and water balance. GCs, on the other hand, are predominantly involved in carbohydrate, fat and protein metabolism, and have anti-inflammatory, immunosuppressive, anti-proliferative, and vasoconstrictive effects [23].

1.2.1. Adverse effect

Despite their significant efficacy, their many adverse effects limit the utility of corticosteroids. Corticosteroid adverse effects appear to be related to both their average dose and cumulative

duration. [24][25] Adverse effects are more common at higher dosages and with chronic use though they are not limited to these cases.[26] Adverse effects are seen in up to 90% of patients who take them for more than sixty days.[26] **[Figure 5]** [27] **[Figure 6]** [24].

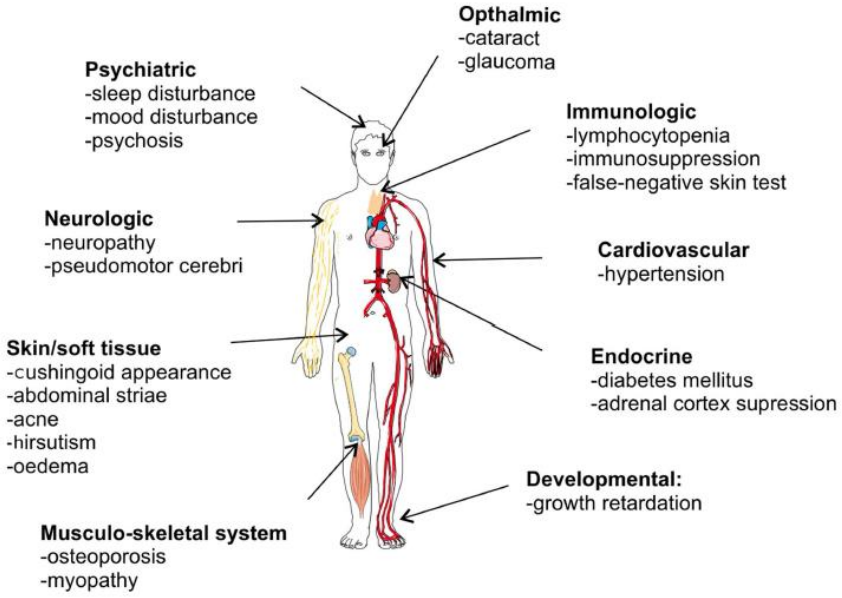

FIGURE 7 | Overview of glucocorticoid-associated side effects.

Figure 5: General side effects of corticosteroids with location in the body [27].

Osteoporosis	• decreasing osteoblast function and life span, and promoting the apoptosis of osteoblasts and osteocytes
Cushingoid appearance and weight gain	• the risk of these complications appears to be dependent on both the dose and duration of treatment
Adrenal suppression	• Adrenal suppression (AS) refers to decreased or inadequate cortisol production that result from exposure of the HPA axis to exogenous GCs [63].
hyperglycemia and diabetes	•Exogenous corticosteroid use is associated with hyperglycemia, and high-dose therapy increases insulin resistance in patients with pre-existing and new-onset diabetes.
cataracts and glucoma	• the risk appears to be dose dependent GC use is typically associated with the development of posterior sub capsular cataracts (PSCC), as opposed to nuclear or cortical cataracts.
Cutaneous	• Corticosteroids induce atrophic changes in the skin that can lead to skin thinning and fragility, purpura and red striae.
Gastrointestinal	• GI events including gastritis, ulcer formation with perforation and hemorrhage, dyspepsia, abdominal distension and esophageal ulceration.
immunosuppresion	• The mechanisms by which corticosteroids inhibit the immune system and decrease inflammation may predispose patients to infection.
other	•growth suppression, memory impairment, agitation, anxiety, fear, hypomania, insomnia, irritability, lethargy, mood lability, even psychosis, hypertension, and obesity.

Figure 6: General side effects of corticosteroids done by students [24].

1.2.2. Toxicity

The toxicity of corticosteroids accounts for one of the most common causes of iatrogenic illness in patients on chronic therapy. No specific reversal agent exists for corticosteroids. Their effect in excess is manageable by gradual taper and addressing the particular complication (e.g., hyperglycemia, infection, and hypertension). [28].

1.3. Aspirin

Aspirin (acetylsalicylic acid (ASA)), which is quickly metabolised into salicylic acid (SAL) *in vivo,* is a commonly used antipyretic, analgesic and anti-inflammatory drug. In addition to its use as a pain killer, it is also administered long-term for the prevention of cardiovascular diseases and cancer [29] [30].

1.3.1. Adverse effect

The adverse effects are outlined in the following section **Figure 7**[31] [32] [33].

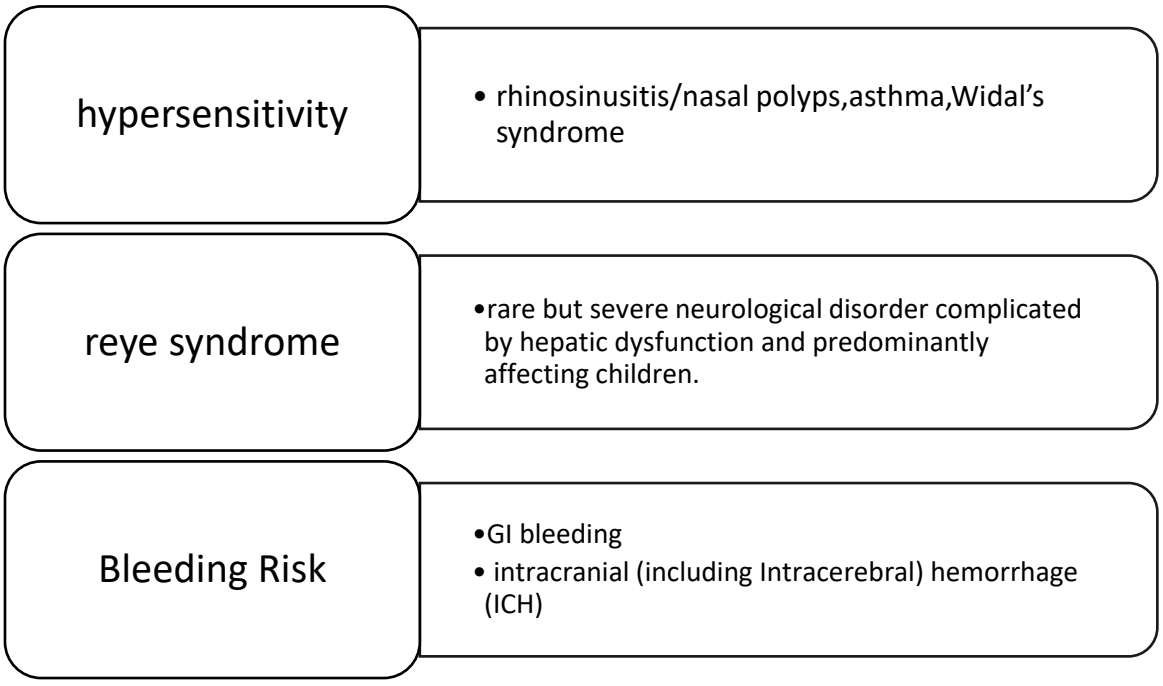

Figure 7: General side effects of Aspirin done by students [31] [32] [33].

1.3.2. Toxicity

Assessment of the likely severity of toxicity following aspirin overdose can be made from the ingested dose (see table 5). [34].

Table 5: aspirin risk assessment [34].

Ingested dose (mg-kg body weight)	**Estimates severity**
<150	Toxicity not expected
150-300	Mild to moderate toxicity
300-500	Serious toxicity
>500	Potentially fatal

The clinical features of aspirin overdose include the following table: [34]

TABLE 6: Severity of Salicylate Poisoning done by students [34].

Grade	**Symptoms**
Mild	Nausea, vomiting, epigastric pain, tinnitus and flushing
Moderate	Sweating, hyperventilation, dehydration, deafness, tremor, respiratory alkalosis with metabolic acidosis (acidosis is predominant in children).
Severe	Hypokalaemia, hypo- or hypernatraemia, hypoprothrombinaemia, hypo or hyperglycaemia, confusion, drowsiness, delirium, pyrexia, coma and convulsions (more common in children). CNS effects Usually resolve if the acidosis is corrected. Rarely renal failure, pulmonary oedema or cardiovascular collapse may occur

1.4. Antibiotics

The advent of antibiotics created an optimistic attitude toward fighting infectious diseases. The antibiotics work by showing various inhibition processes like inhibition of protein biosynthesis, inhibition of folic acid metabolism, and inhibition of DNA metabolism; some may also target bacterial cell wall synthesis [35] [36].

The introduction of antibiotics into clinical use was arguably the greatest medical breakthrough of the 20th century [37] [38]. **(Figure 8)** [39]

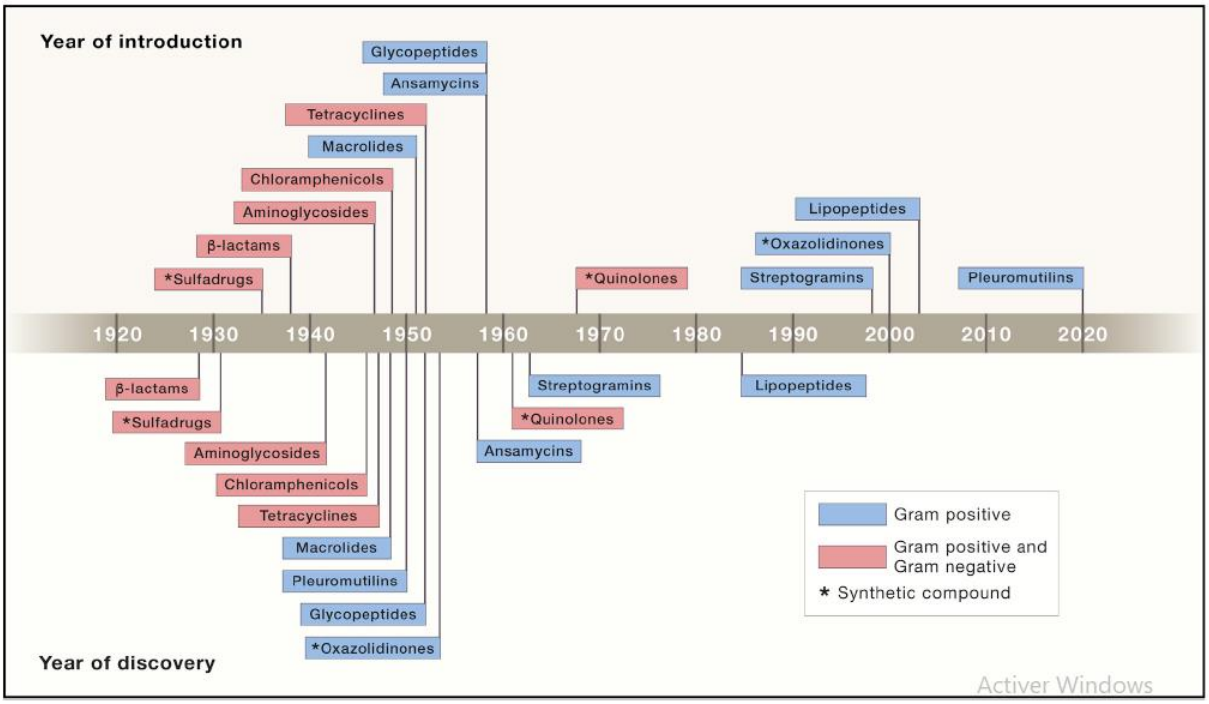

Figure 8: The Timeline of Antibiotic Discovery [39].

1.4.1. Antibiotic resistance

Antibiotic resistance in pathogenic bacteria can be defined microbiologically or clinically. Microbiological resistance is the presence of a genetically determined resistance mechanism (acquired or mutated), categorizing the pathogen as resistant or susceptible based on the application of a set cut-off in a phenotypic laboratory test. Clinical resistance is a level of antimicrobial activity that is correlated with a high likelihood of therapeutic failure; in other

words, treating a pathogen with a drug to which it has tested susceptible produces a better outcome than is attained with a drug to which the pathogen has tested resistant. [40] [41].

A brief timeline of antibiotic resistance is provided in **Figure 9** [42].

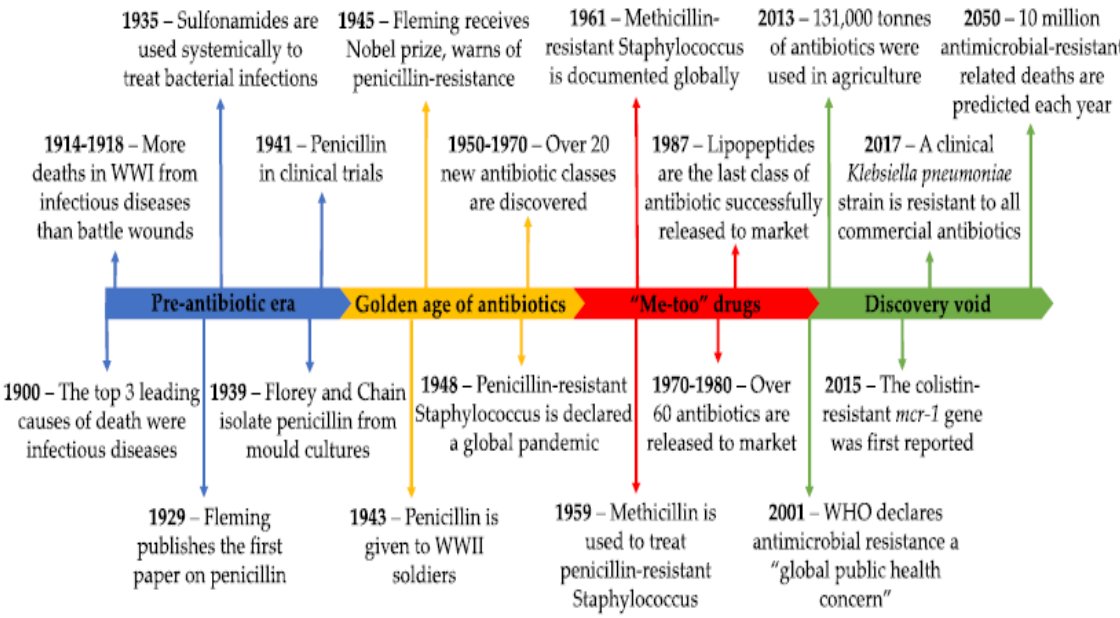

Figure 9: A summary of events in the antibiotic-resistance timeline. [42]

1.5. Vitamin and mineral

1.5.1. Vitamin C

Vitamin C has a protective influence on several disease states, most notably the common cold, cardiovascular disease, and some cancers (Figure 10). Many other disease states have been studied in relationship to vitamin C, including age-related macular degeneration, cataract, diabetes, and rheumatoid arthritis; however, the link between vitamin C and these conditions has not been clearly established. [43]

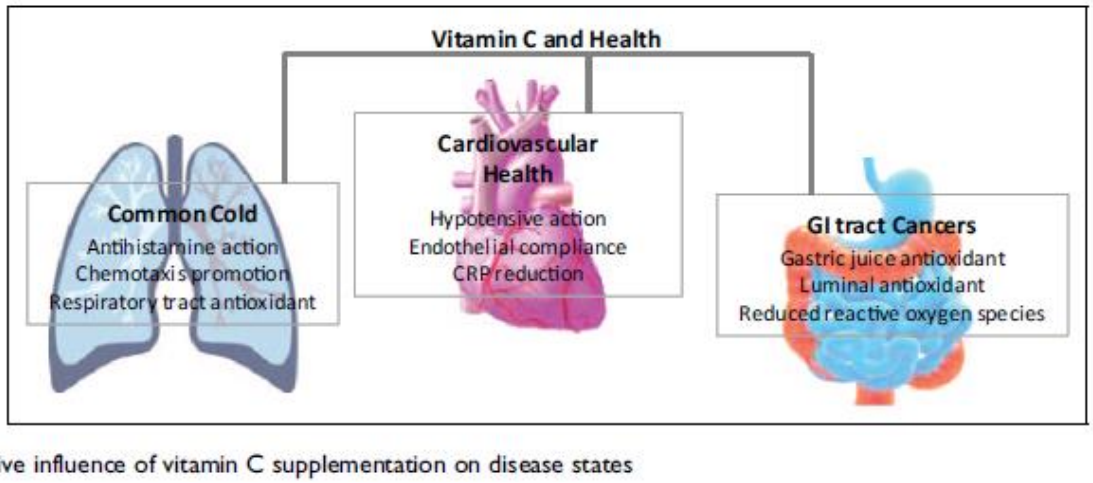

Figure 10: protective influence of vitamin c on disease [43]

1.5.1.1. Toxicity

The IOM set the Tolerable Upper Intake Level for oral vitamin C ingestion at 2 g daily for adults based on gastrointestinal disturbances observed in some individuals at higher doses. High amounts of vitamin C intake have been associated with an increased risk of kidney stones. [44]

1.5.2. Vitamin D

Vitamin D is a fat-soluble vitamin that has a major role in phospho-calcium metabolism, maintaining normal calcium levels and bone health development [45]. Vitamin D has two essential compounds: vitamin D3, or cholecalciferol and vitamin D2 or ergocalciferol. Both forms of vitamin D play significant roles in the body, protecting it against rickets or bone demineralization, hypertension, cancers, or autoimmune disorders. It also plays a crucial role in anti-infective defense through the anti-inflammatory, immunomodulatory, proapoptotic, and antiangiogenic effects. [45]

1.5.2.1. Toxicity

Vitamin D intoxication (VDI) resulting from supplementation has been reported rarely but may now occur more frequently. This may be attributable to an increase in vitamin D

supplement intake due to the findings that deficiency is common and has been associated with a number of disease states1.

Vitamin D intoxication (VDI) differs from hypervitaminosis D; the normal serum vitamin D levels and clinical definitions are shown in Table 7 [46].

Table 7: Clinical Definitions of 25 (OH)-D Levels [46]

Vitamin d	**25(OH)-D nmol-l**	**Ng-ml**
Normal	50-250	20-80
Excess	250	100
Intoxication	375	150

Hypervitaminosis D is a condition where an increase in the 25-hydroxyvitamin D (25OHD) levels is associated with either hypercalcemia or hypercalciuria, or both. VDI occurs in patients with one or more of the clinical findings listed in Table 8 [46]

Table 8: Symptoms and Findings Associated with Hypercalcemia due to Vitamin D Intoxication [46]

gastrointestinal	**-Nausea and vomiting** **-anorexia, abdominal pain** **-intestinal decreased motility , constipation** **-Growth retardation , pancreatitis , peptic ulcer**
renal	-polydipsia , polyuria, dehydration and fever -humaturia, hypernatraemia , hypomagneseemia , hypokalemia -nephrolithiasis , nephrocalcinosis , distal renal tubular acidosis -nephrogenic diabetes insipidus , chronic interstitial nephritis - acute and chronic renal failure

Central nervous system	-hypotentonia , paresthesia -deep tendon reflexes reduction , headache - confusion , seizures , cerebral vasospam -mesial temporal sclerosis , apathy , lethargy, stupor , coma -Psychiatric disorder
cardiovascular	-arrhythmia , bradycardia -heart valves , coronary arteries and myocardial fibre-accumulation of calcium -hypertension -cardiomyopathy -cardiac arrest
Musculoskeletal	-muscle weakness -bone pain - osteopenia, osteoporosis - long bones metastatic calcification -osteopetrosis
eyes	-band keratopathy -conjunctival calcification
Skin	-metastatic calcification -itching

1.5.3. Zinc

Zinc is essential for various cellular processes such as differentiation, apoptosis, and proliferation, which influences growth and development of an organism. Moreover, in the past two decades, the knowledge about its importance as a signaling molecule increased, particularly in the immune system and as a neuro-modulator in synaptic vesicles. [47]

1.5.3.1. Toxicity

Following an oral intake of extremely high doses of zinc (where 300 mg Zn/d – 20 times the US RDA – is a "low intake" overdose[48]), may occur:

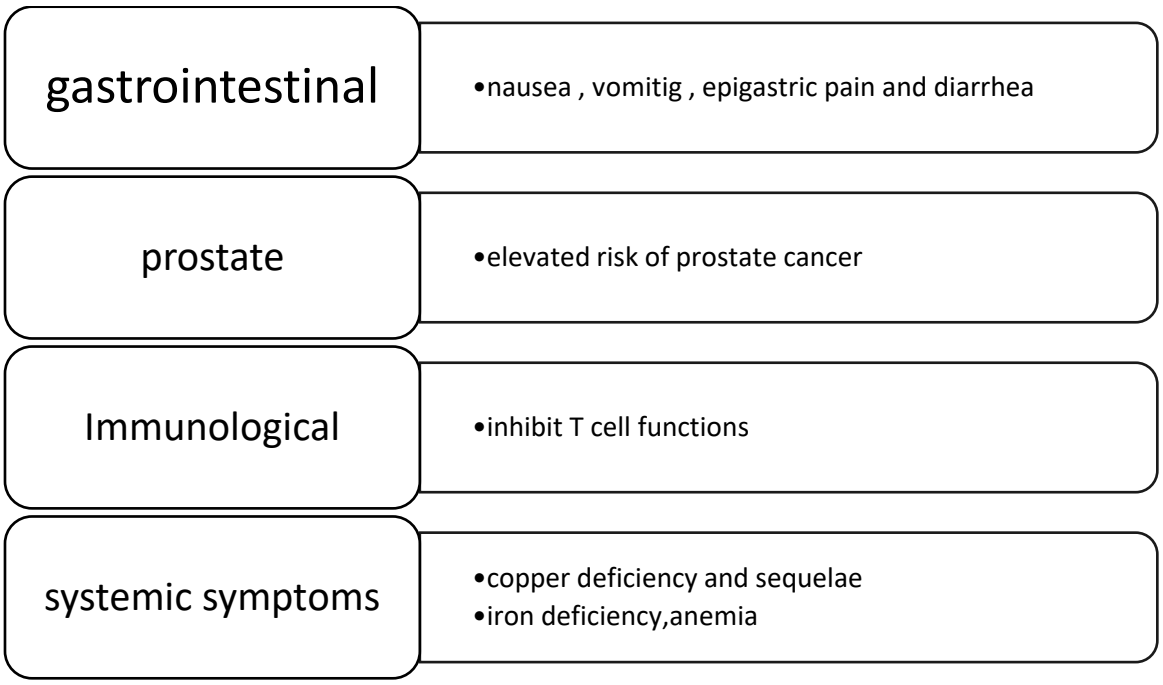

Figure 11: Symptoms due to Zinc Intoxication done by students [49].

1.5.4. Magnesium

Magnesium (Mg2+) has several functions in the human body. It acts as a cofactor for more than 300 enzymes, regulating a number of fundamental functions such as muscle contraction, neuromuscular conduction, Glycemic control, myocardial contraction, and blood pressure [50]. Moreover, magnesium also plays a vital role in energy production, active transmembrane transport for other ions, synthesis of nuclear materials, and bone development [51] [52].

1.5.4.1. Toxicity

Hypermagnesemia has been found to be associated with higher mortality and longer hospital stay [53] .Hypermagnesemia is usually iatrogenic and is reported along with impaired kidney function, bowel disorders, and old age. Other uncommon causes of hypermagnesemia include lithium therapy, hypothyroidism, Addison’s disease, familial hypocalciuric hypercalcemia, and milk alkali syndrome [54] .Clinical consequences of hypermagnesemia vary according the serum magnesium level [55, 56] (Table 9) [57]

Table 9: Symptoms of hypermagnesemia [52]

Serum mg levels	**Manifestations**
0.70-1.0mmol\l	Normal level
2.2-3.5mmol\l	Nausea, vomiting , facial flushing , urinary retention , ileus and hypotension
3.9-5.2mmol\l	Somnolence , absence of the deep tendon reflex , and complete heart blockage
>6.5mmol\l	Respiratory depression , paralysis , and complete heart blockage
<8.7mmol\l	Asystole

Practical part:

Introduction:

In the first part, we discussed the term "self-medication," its causes, risks, the actors involved, their responsibility, and their attitudes towards self-medication. In this second part, our objective was to examine the reality of this practice in Algeria through a study conducted in the form of a survey among community pharmacists and individuals from the general population. We will outline the methodology employed in this study, present the obtained results, and draw conclusions based on the findings

I. Materials and Method:

This survey was conducted through anonymous questionnaires (see appendix 1and 2), which we personally established based on the main goals of our study, the questions it should answer, as well as several bibliographic references that we mentioned throughout our thesis.

We placed the survey on a website and it was answered by various groups of the Algerian population.

1. Study area:

A study has been conducted on various Algerian states.

Algeria is a country located in North Africa, bordered by the Mediterranean Sea to the north, Tunisia to the northeast, Libya to the east, Niger to the southeast, Mali to the southwest, Western Sahara, Mauritania, and Morocco to the west. Its capital city is Algiers, located on the Mediterranean coast. Algeria is the largest country in Africa and the tenth largest country in the world in terms of land area. It has a diverse landscape, including the Sahara Desert, the Atlas Mountains, and a Mediterranean coastline. The country has a rich history and cultural heritage, influenced by its indigenous Berber population, as well as its history of Arab and European colonization. [57] **Figure 12**

Figure 12: Geographical map of Algeria.

2. Type of survey:

We conducted a prospective and retrospective observational study.

The completed questionnaires were processed with Microsoft Excel

3. Sample size and composition:

Our sample consists of 30 community pharmacists, as well as 202 individuals from the general population.

3.1. Community pharmacists:

They are specialists in medication and are solely responsible for its dispensation. They have a role as advisors and health educators when it comes to dispensing medications. They must provide tailored advice based on the patient's condition, taking into account their medical history, and promote the proper use of medications. The pharmacist's follow-up of patients ensures better quality of care and, in collaboration with the physician, promotes the appropriate use of medications while reducing the harmful effects of irrational self-medication.

This aspect has allowed us to estimate the extent to which people resort to self-medication, determine the most requested therapeutic classes, and gain insight into the role of the pharmacist as a key actor in the spread of this practice.

3.2. The population:

These are the ordinary users of medications, of both sexes and different age groups, social and intellectual levels, in the various provinces of Algeria who turn to pharmacies to treat their own ailments or those of their loved ones on a daily basis, either through a medical prescription or their own initiative.

This has allowed us to conduct our survey, determine the extent of the phenomenon of self-medication, what motivates it, its causes and consequences, its frequency, and most importantly, the level of awareness among the population.

4. Period of completion of the investigation:

The investigation lasted for two months, from March 10, 2023, to May 10, 2023.

Results and Discussions:

I. Results:

1. The results of the survey conducted among the population:

The study was conducted on 202 individuals from the Algerian population, representing all regions of the country. The sample included both men and women, without age restrictions, encompassing children, adults, and seniors, as well as married and single individuals.

The questionnaire consists of two parts:

Part one : General Information Section:

1. What is your Province?

   .....

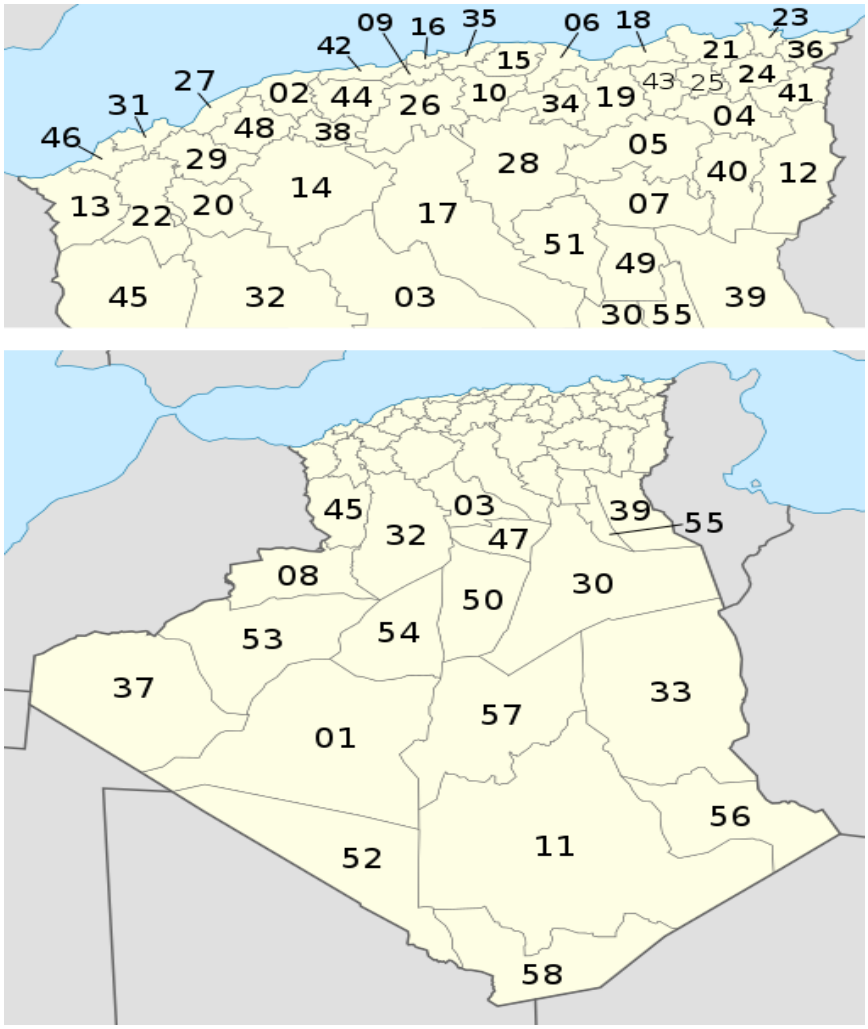

Figure 13: Provinces of Algeria

- The different regions targeted during this investigation are thirty (30) in number :

Province	The number of participants
Biskra	87
Chlef	19
Blida	16
Algeries	11
Anidefla	7
Medea	6
Jijel	6
Oran	5
Mostaganem	5
Illizi	4
Tipaza	4
Djelfa	4
Eloeud	3
Costantine	3
Laghouat	3
Boumerdes	2
BordjBouArreridj	2
Batna	2
Bejaia	2
Almaghaier	1
Tebessa	1
Ourgla	1
Skikda	1
Tizi Ouzou	1
Khenchela	1
Mila	1
Aintemouchent	1
Ghardaia	1
Beni Abbes	1
Guelma	1

Table 10: The distribution according to the province

2. What is your age?

   .....

- The study included all age groups, including those under 30 years old, 155person (76, 73%) between 30 and 50 years old, 26person (12, 87%) and above 50 years old, 21person (10, 39%).

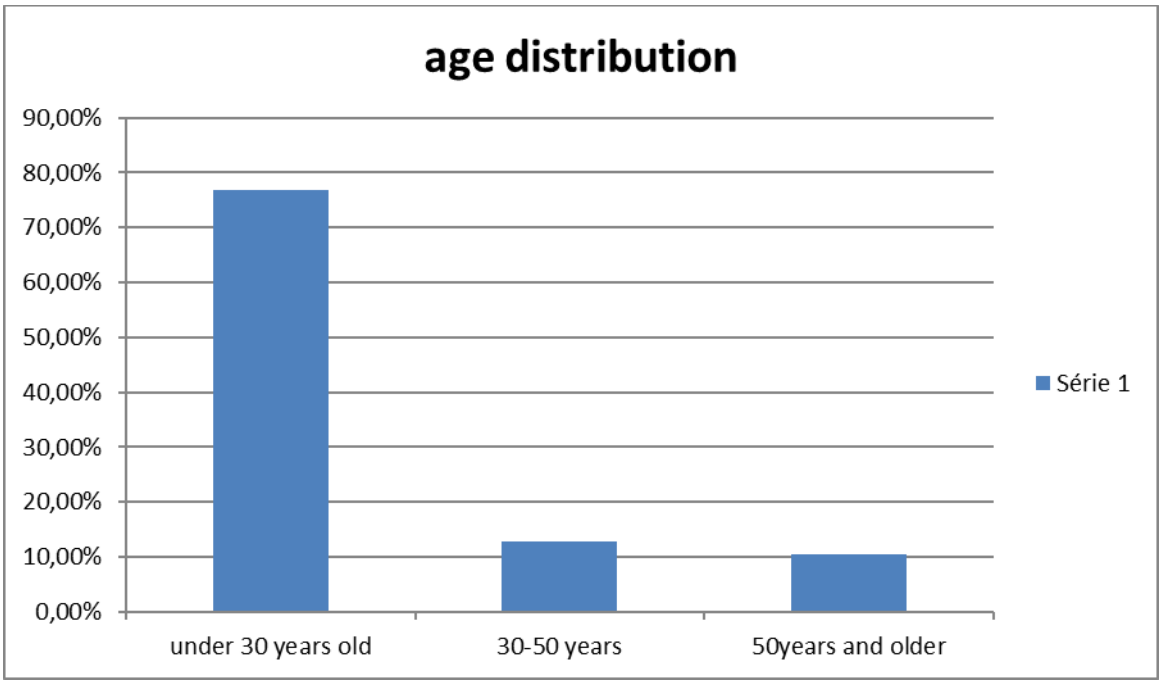

Figure 14 : Distribution by age group

3. What is your gender?
   - Male
   - Female

- According to the total number of 202 collected responses78 men and 124women.A percentage of: Male: 38, 6% and Female: 61, 4%

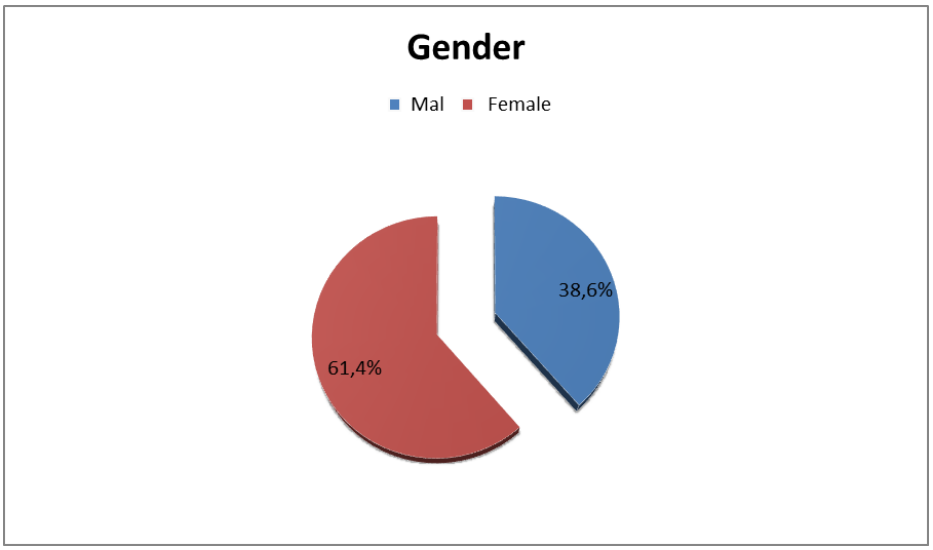

Figure 15: Distribution by gender

4. What is your marital status?
    - Unmarried
    - Married

➢ The study included 149 unmarried individuals, accounting for 73.8%, and 53 married individuals, accounting for 26.2%.

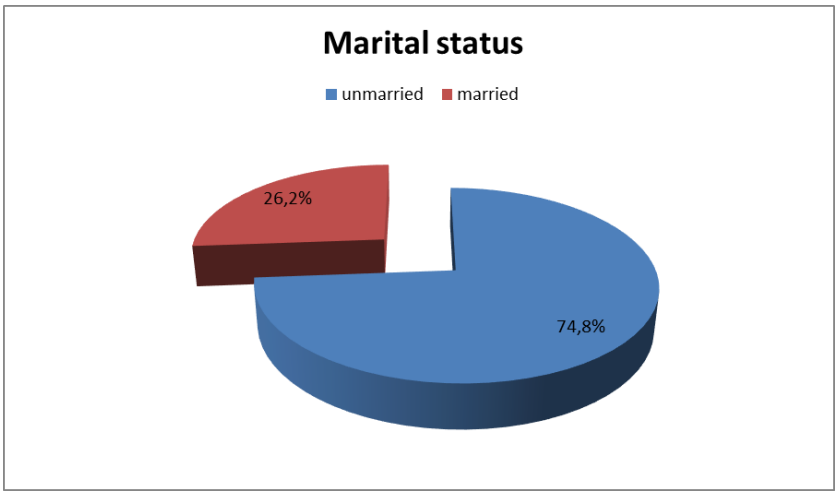

Figure 16: Distribution by marital status

5. What is your Highest Qualification?
    - The primary education level
    - The middle school level
    - The high school level
    - the college level

- diploma
- PhD

➢ 7 individuals answered in the primary education level, accounting for 3.5%. 10 individuals answered in the middle school level(5%), 16 individuals in the high school level(7,9%), 104 individuals in the college level(51,5%), 53 individuals with diploma (26,2%)and 12 individuals with PhD(5,9%).

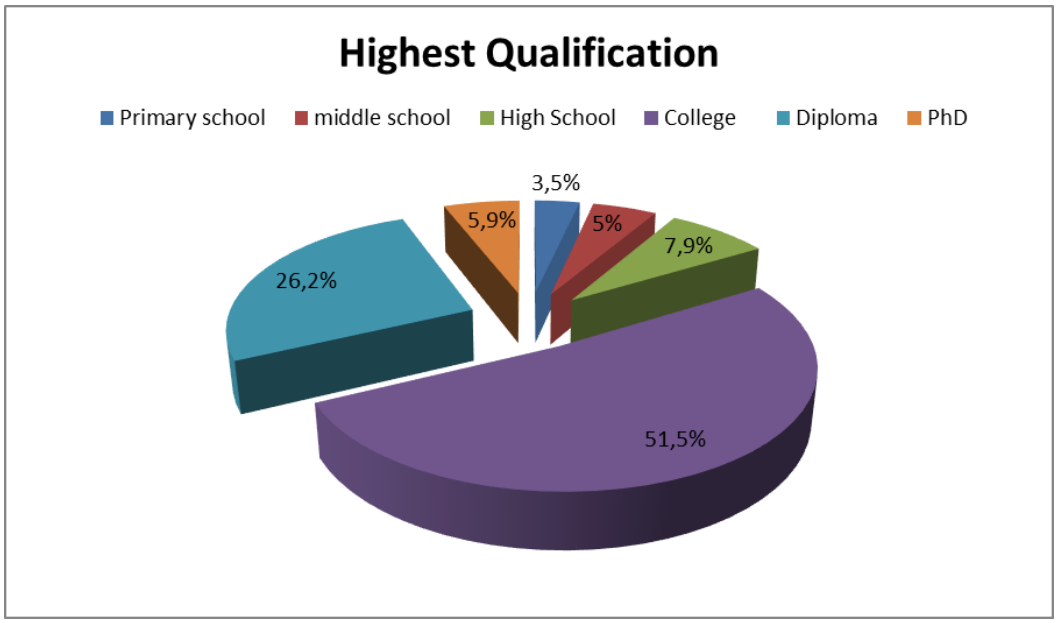

Figure 17: Distribution of the population by educational level

6. If you are a university student, what is your course?
   - medical courses
   - paramedical courses
   - other courses

1. A total of 169 college participated in the survey, with 46(27,2%) of them studying a medical courses, 7(4,1%) studying a paramedical courses, and 116 (68,6%)pursuing other courses.

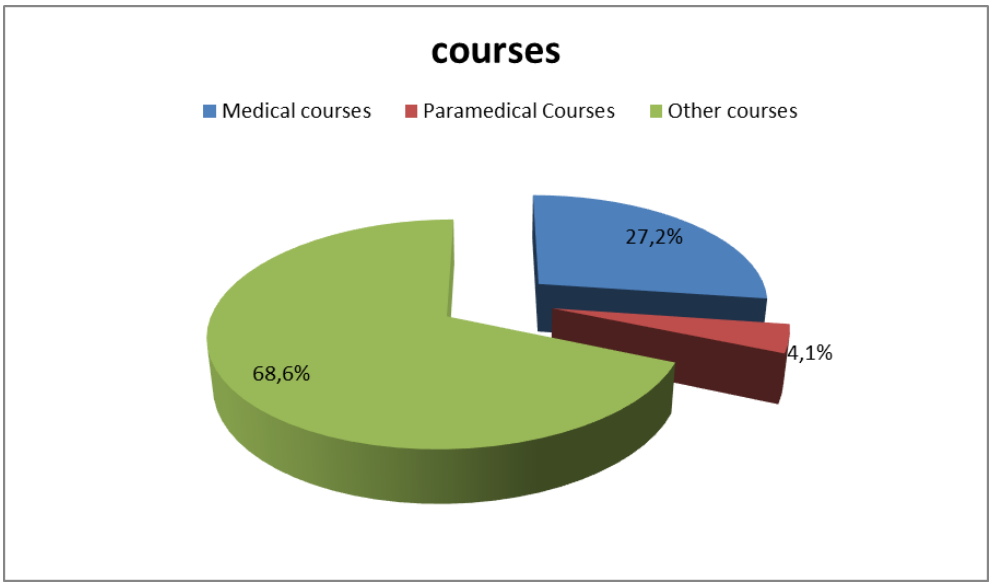

Figure 17: Distribution of the population by educational courses

7. What is your profession?

.....

2. 37 individuals responded as graduates, 11(22, 91%) individuals work in the medical sector and 37 (77, 08%) individuals work in another sector.

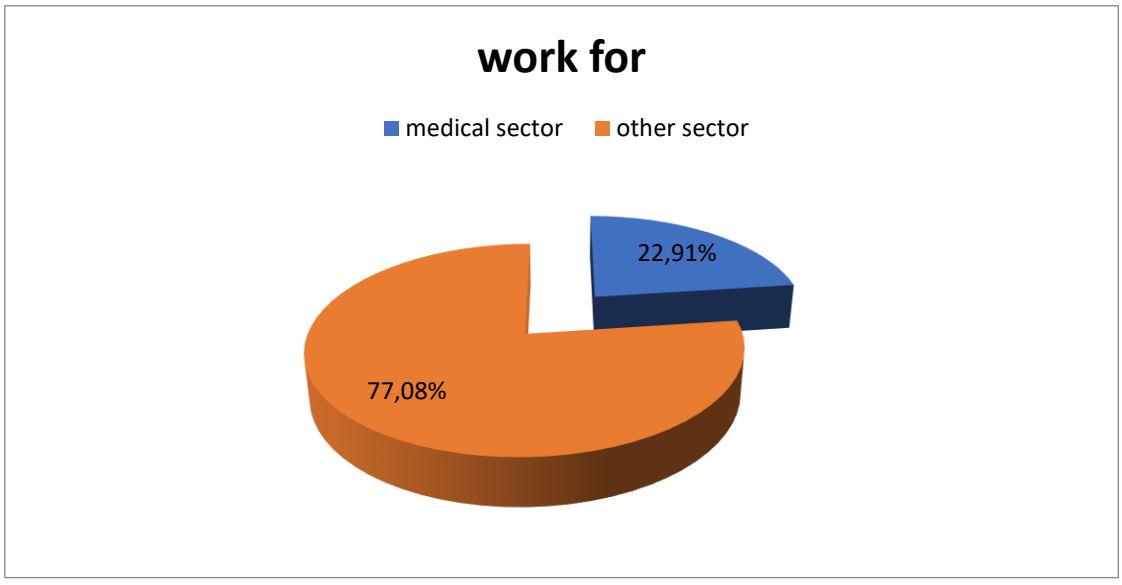

Figure 18: Distribution of the population by work sector

Part two: Self-Medication habits

1. Self-Medication habits with drugs

1. Do you use these medications for self-medication ?

- Paracetamol
  - Yes
  - No
- Corticosteroid
  - Yes
  - No
- Anti-inflammatory
  - Yes
  - No

➢ Paracetamol:95%(192persons) use paracetamol for self-medication.

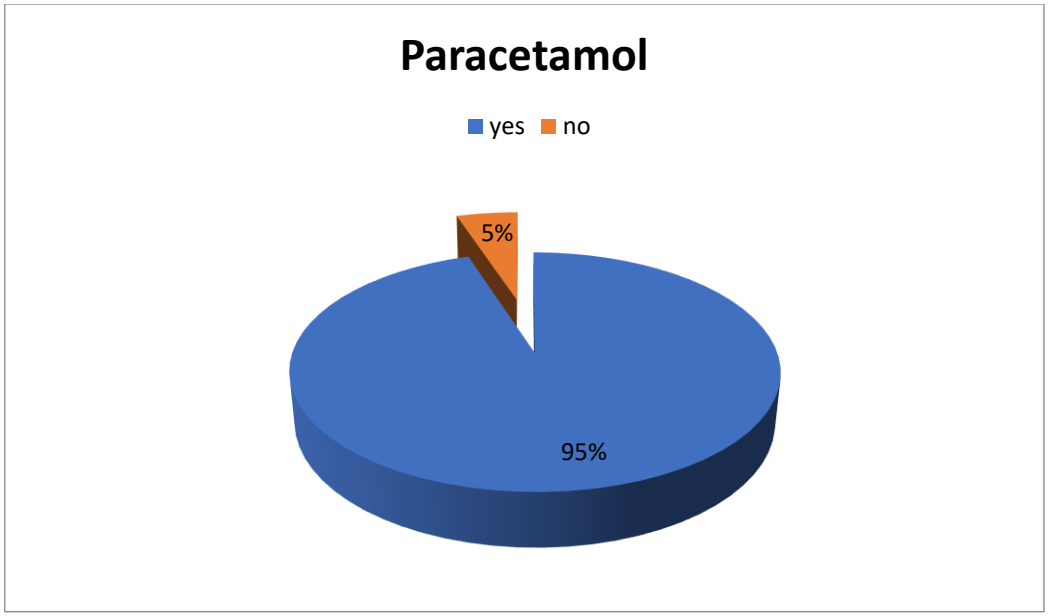

Figure 19: Percentages of self-consumption of paracetamol

➢ Corticosteroid: 76 individuals use corticosteroids, accounting for 37.6%, while 126 (62, 4%) individuals do not use them for self-medication.

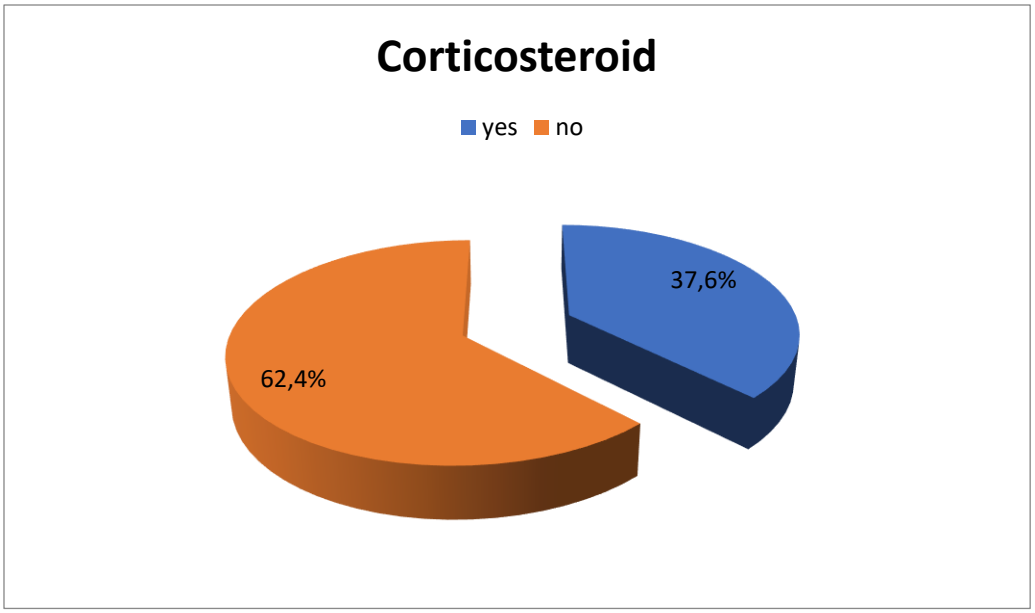

Figure 20: Percentages of self-consumption of corticosteroid

- Anti-inflammatory:62.4 % (126persons) use anti-inflammatory drugs for self-medication, while the remaining percentage does not use them.

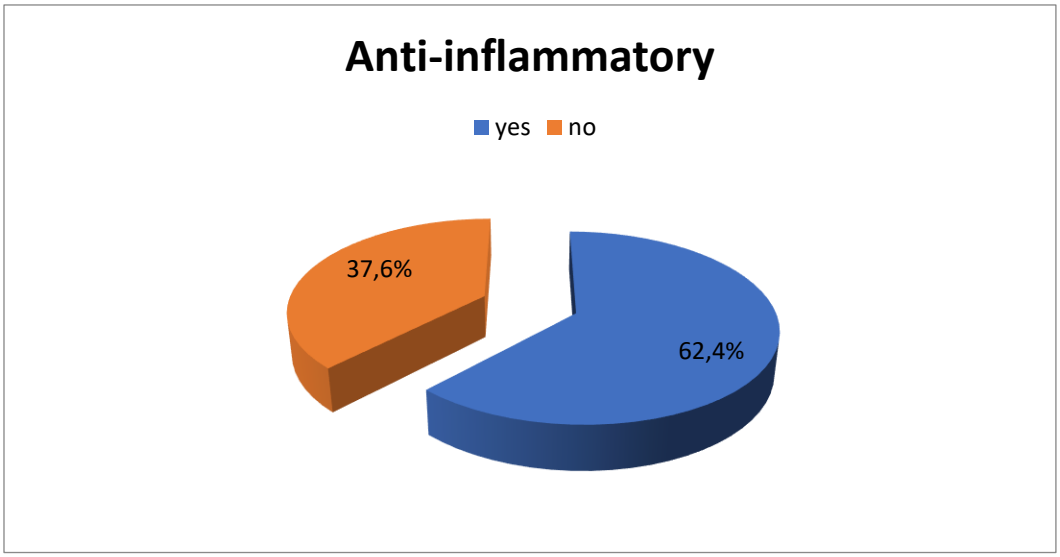

Figure 21: Percentages of self-consumption of Anti-inflammatory

2. Did you take any of the previous medications because you suffer from a chronic disease?
    - Yes
    - No

- 23, 8% is equivalent to 48 people answering "yes," while the remaining percentage of 76.2% answered "no."

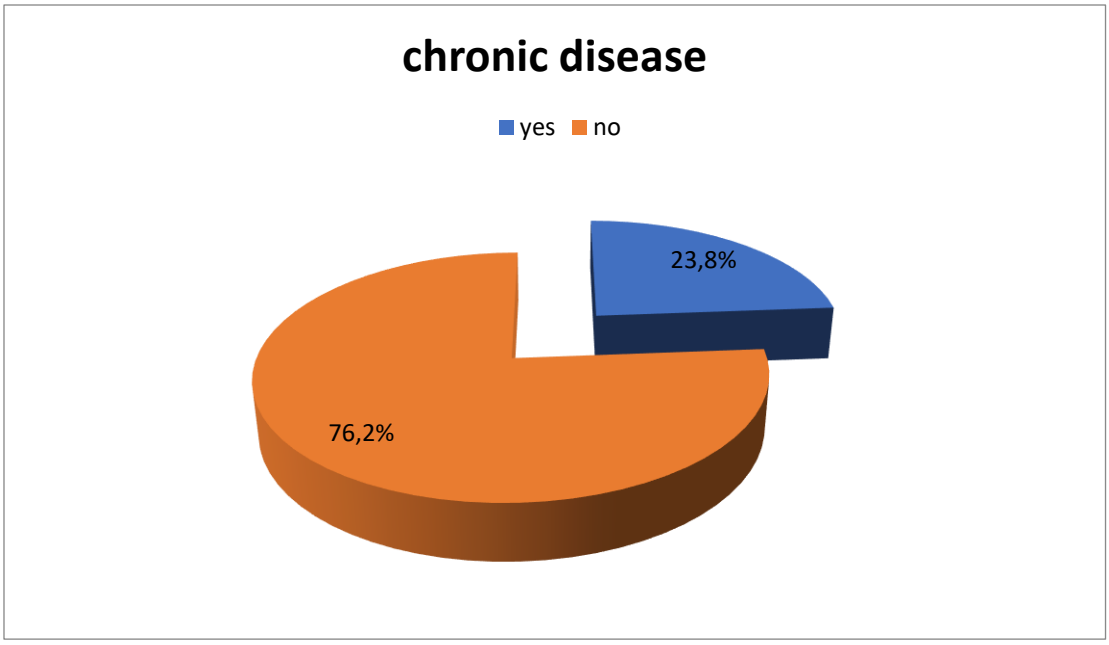

Figure 22: The percentage of self-medication among individuals with chronic diseases

3. Do you check the prescribing information before self-medicating?
    - Yes
    - No
    - Sometimes

➢ 104(51, 5%) people answered "yes," 21(10, 4%) people answered "no," and the rest (38, 1%) answered "sometimes."

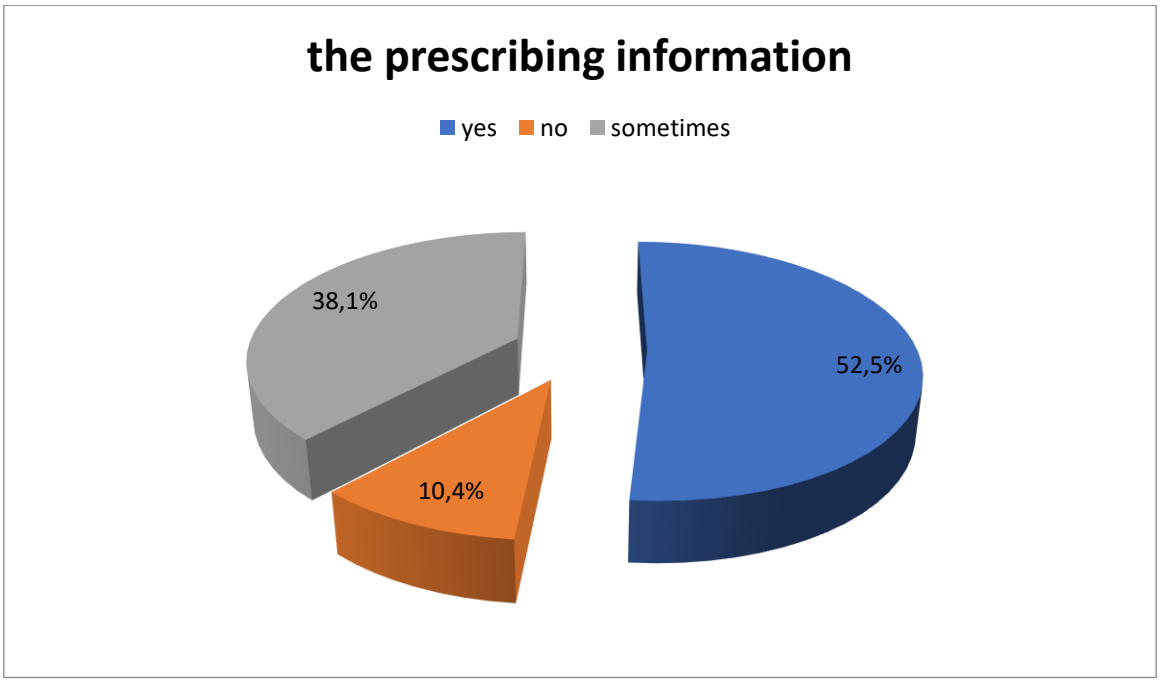

Figure 23: The percentage of individuals who check the prescribing information

4. Do you understand the instructions of prescribing information?
    - Yes
    - No

➢ 143 people, which are equivalent to a percentage of 71.16%, understand it, while a percentage of 28.9% (equivalent to 58 people) do not understand it.

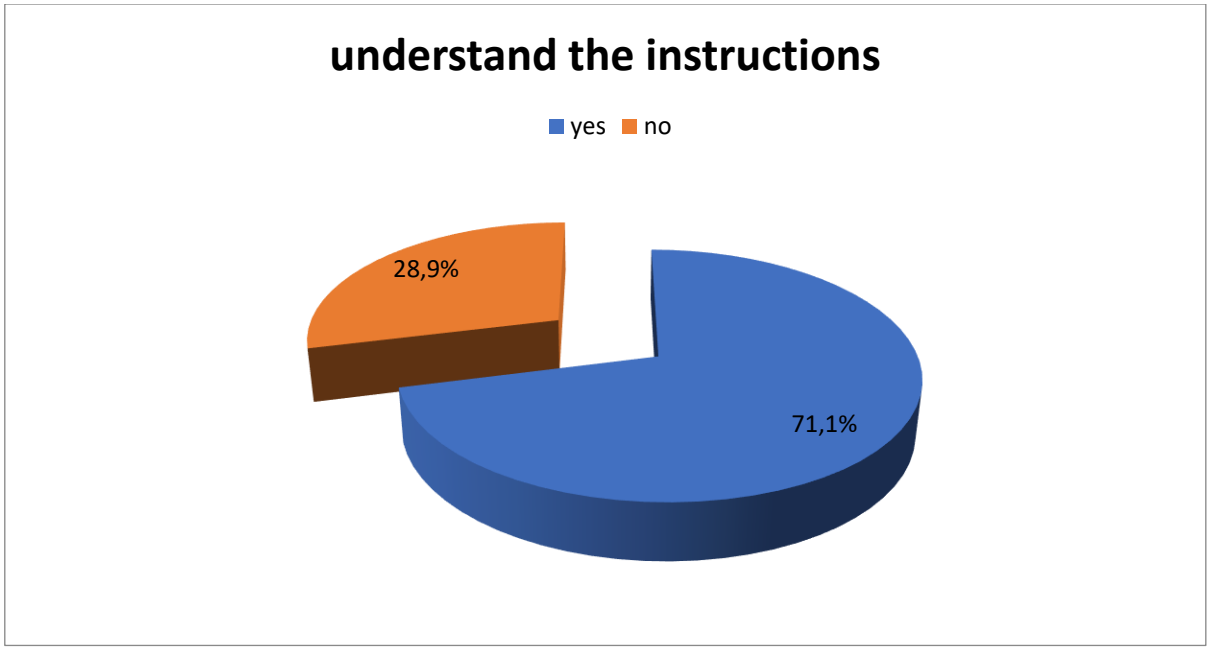

Figure 24: The percentage of individuals who understand the prescribing information

5. Did you follow instructions for use?
    - Yes
    - No

➢ 132(65, 3%) people follow the instructions for use, while 70(34, 7%) people do not follow them.

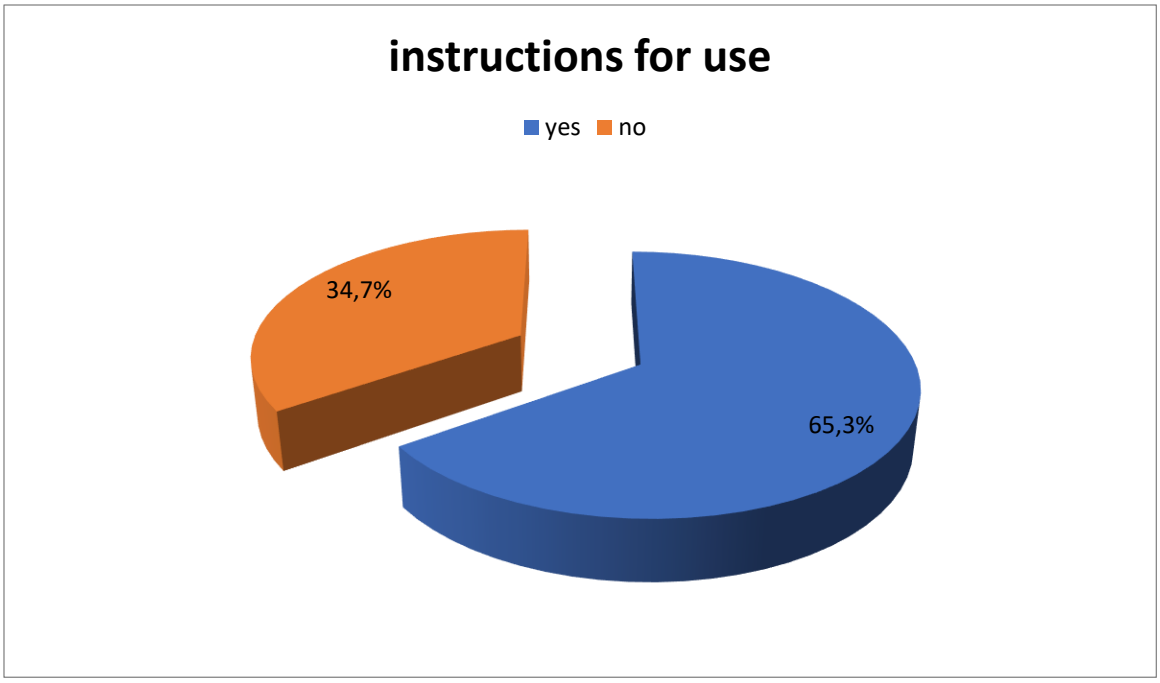

Figure 25: The percentage of individuals who follow the prescribing information

6. What was your reason for self-medication?
    - High fees of doctor
    - I have old prescription
    - family or friend advice
    - Saves time
    - Other

➢ 39% answered to avoid medical examination costs, 45% for not following the old prescription, 40% answered that they follow the advice of their friends and family, 40% do not have time for an examination, and 44% for other reasons.

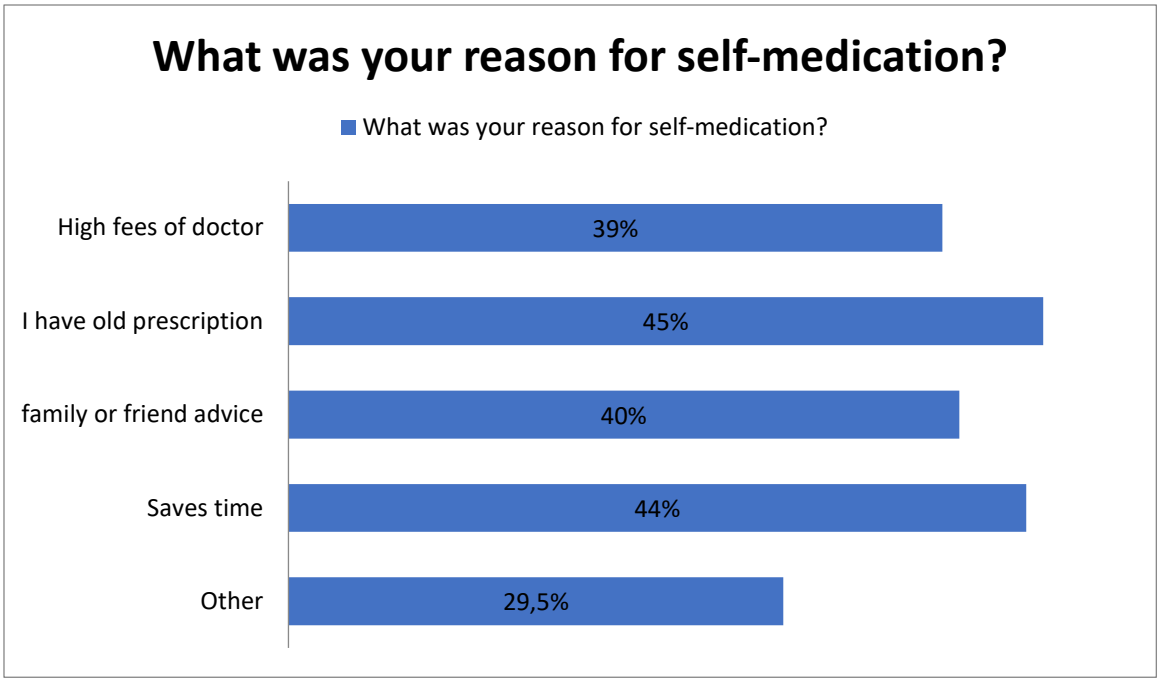

Figure 26: the percentage of self-medication reasons

7. From whom do you obtain your drugs for self-medication?
    - Pharmacist
    - Pharmacy salesperson

➢ 117(58, 5%) people buy their medication from a pharmacist, while 83(41, 5%) people buy it from a pharmacy salesperson.

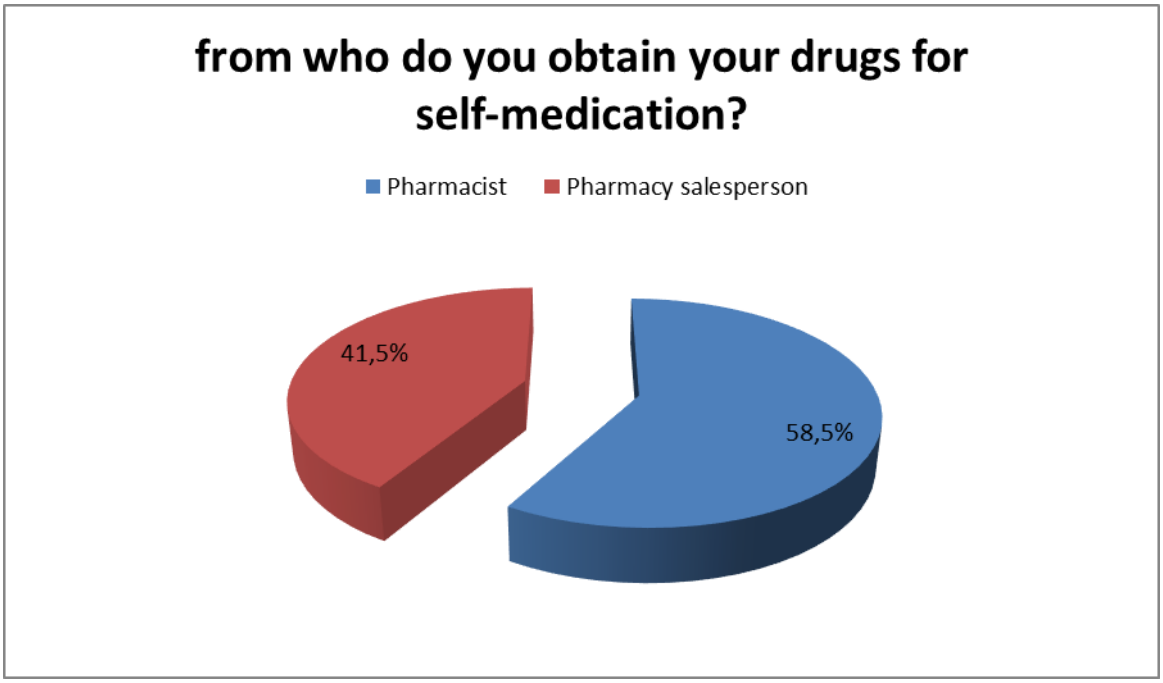

Figure 27: The percentage of self-medication sources

8. Have you been educated about the risks of self-medication?
    - Yes
    - No

➢ 70 people answered "yes," while 132 people answered "no."

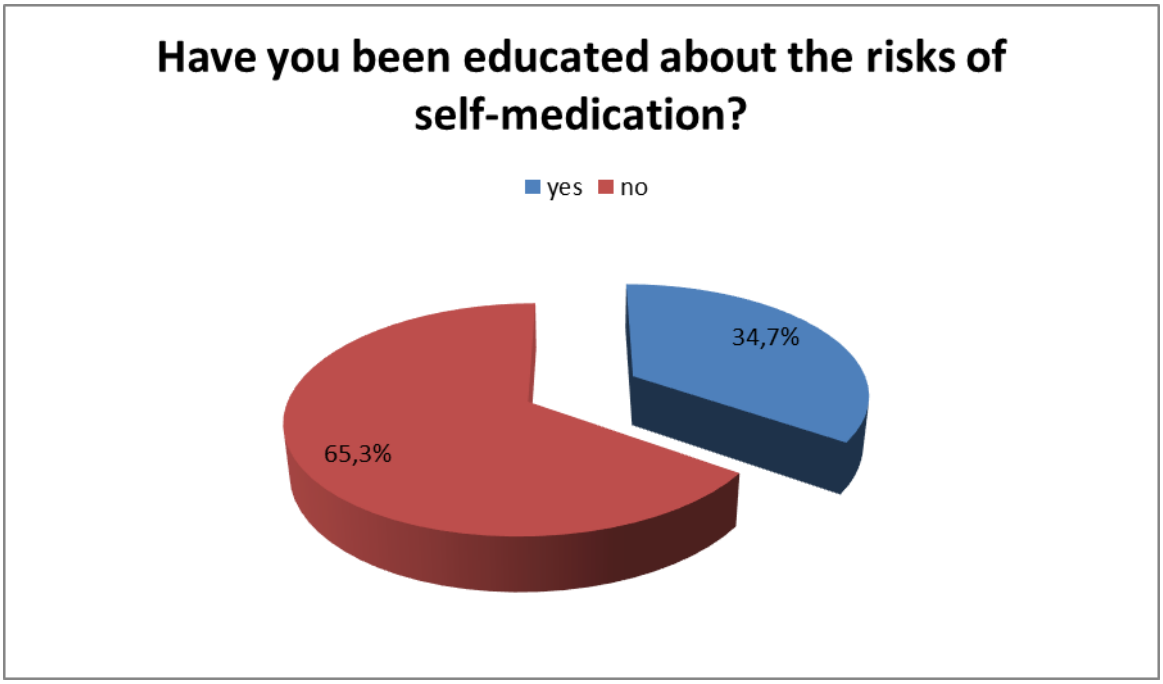

Figure 28: The percentage of individuals who have been educated about the risks of self-medication

9. If your answer is yes, from who?
    - The university (Medical courses ….)
    - awareness campaigns
    - gain knowledge through friends
    - By reading (scientific articles on the topic – internet…)

➢ Among those who answered "yes," 68 people responded to this question, where 22% were educated about the risks of self-medication at the university, 39.7% by awareness campaigns , 19.1% by acquiring knowledge from friends, and 19.6% by reading scientific articles on the topic.

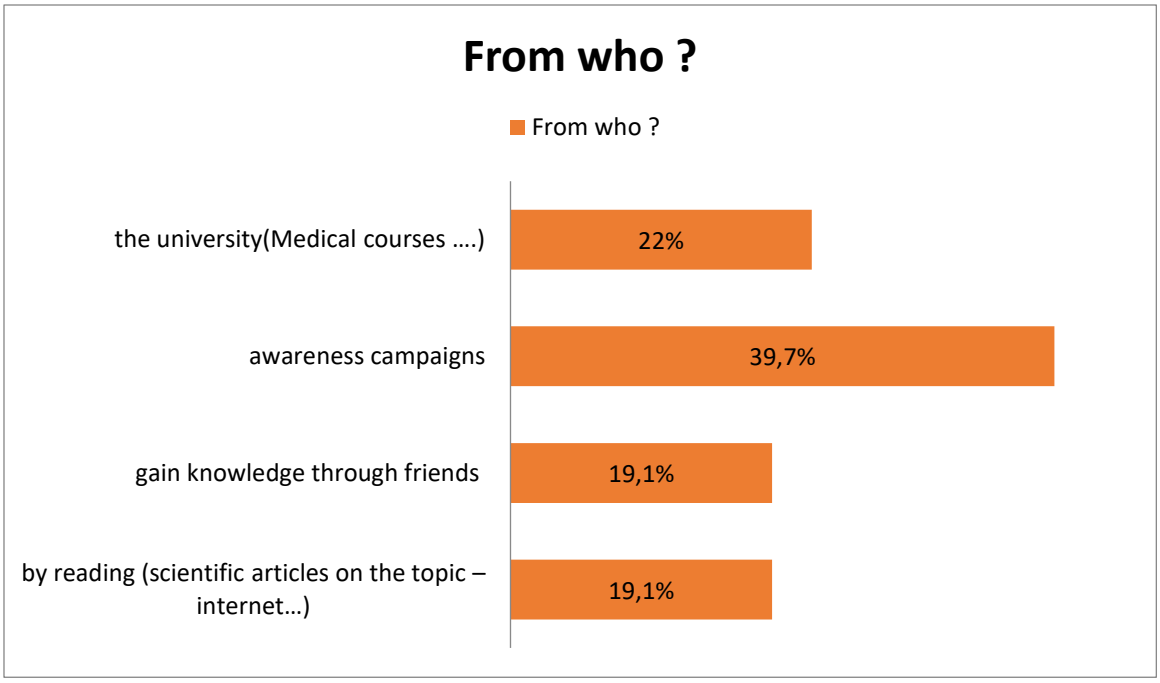

Figure 29: distribution by education source

10. Have you ever experienced adverse events with self-medication?
    - Yes
    - No

➢ The majority answered "no," with a percentage of 63.5%, while 36.5% answered "yes."

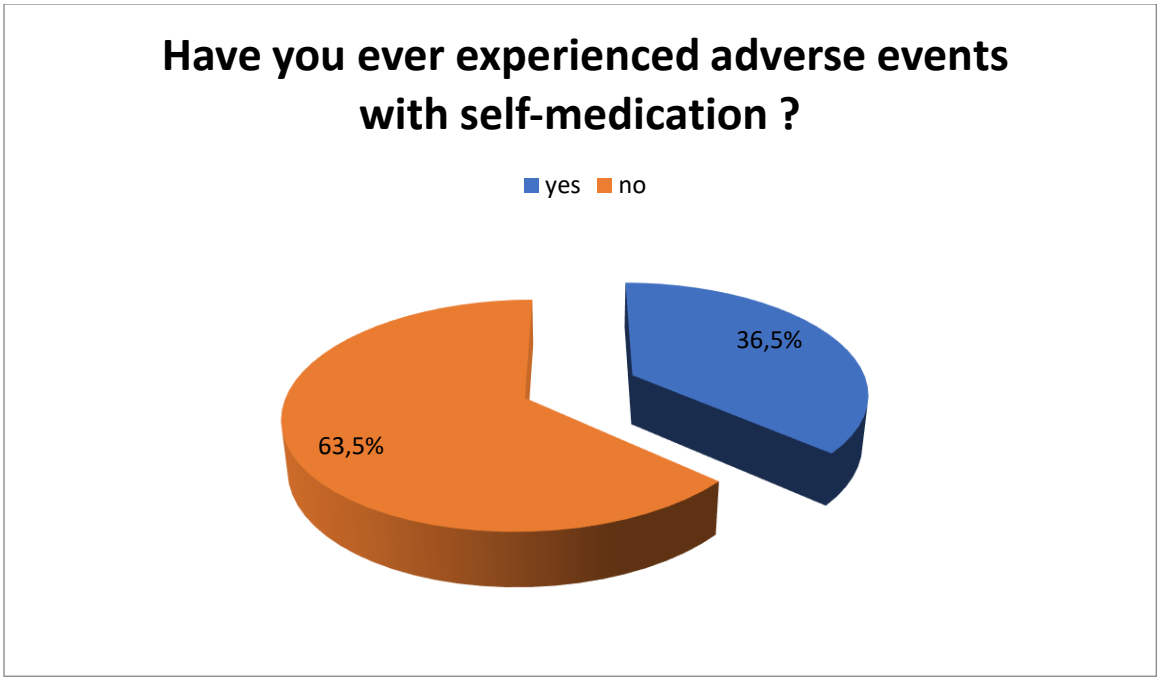

Figure 30: The percentage of individuals who have experienced adverse events

11. If your answer is yes, what is it?
    - Hyperglycemia
    - Hypertension
    - Allergies
    - Bleeding
    - Other complications (digestive system disorders….)

➢ Here is the distribution of individuals according to the different conditions:

- High blood sugar: 43 out of 73 individuals.
- Bleeding: 37 out of 73 individuals.
- Allergies: 40 out of 73 individuals.
- High blood pressure: 40 out of 73 individuals.
- Other complications such as digestive and gastrointestinal problems: 51 out of 73 individuals.

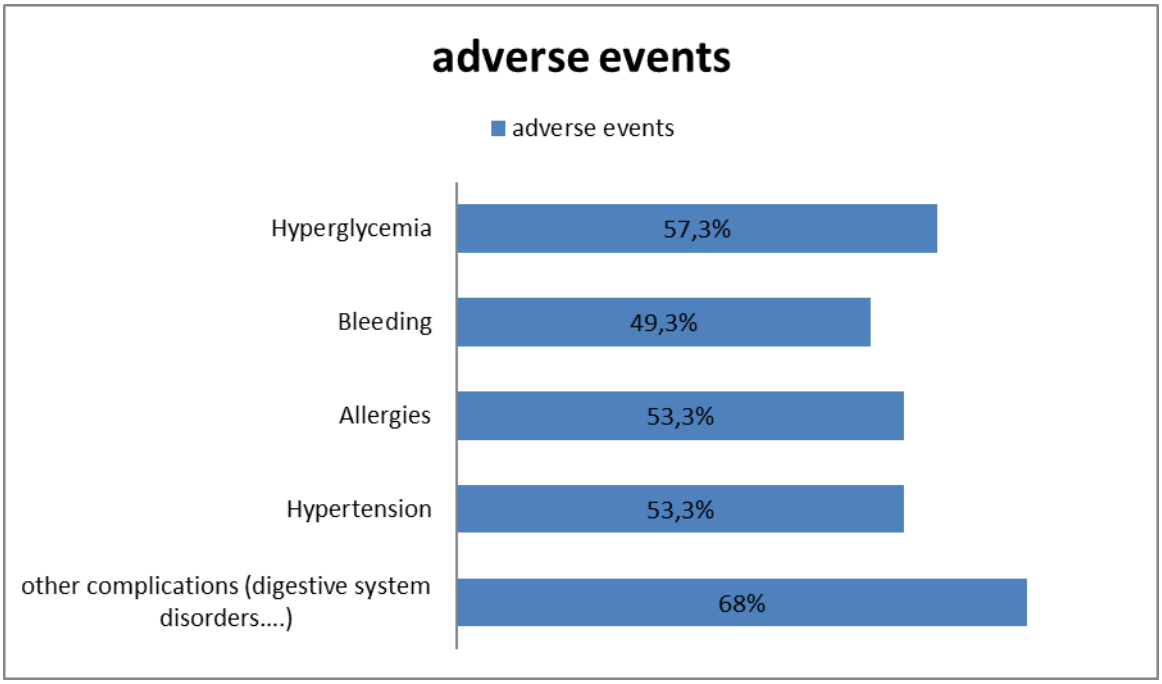

Figure 31: The percentage of different adverse events in self-medication

2. Self-Medication habits with antibiotics

1. Have you ever self-medicated yourself with antibiotics?

- Yes
- No

➢ 136 people out of 202 answered "yes," and 66 people answered "no."

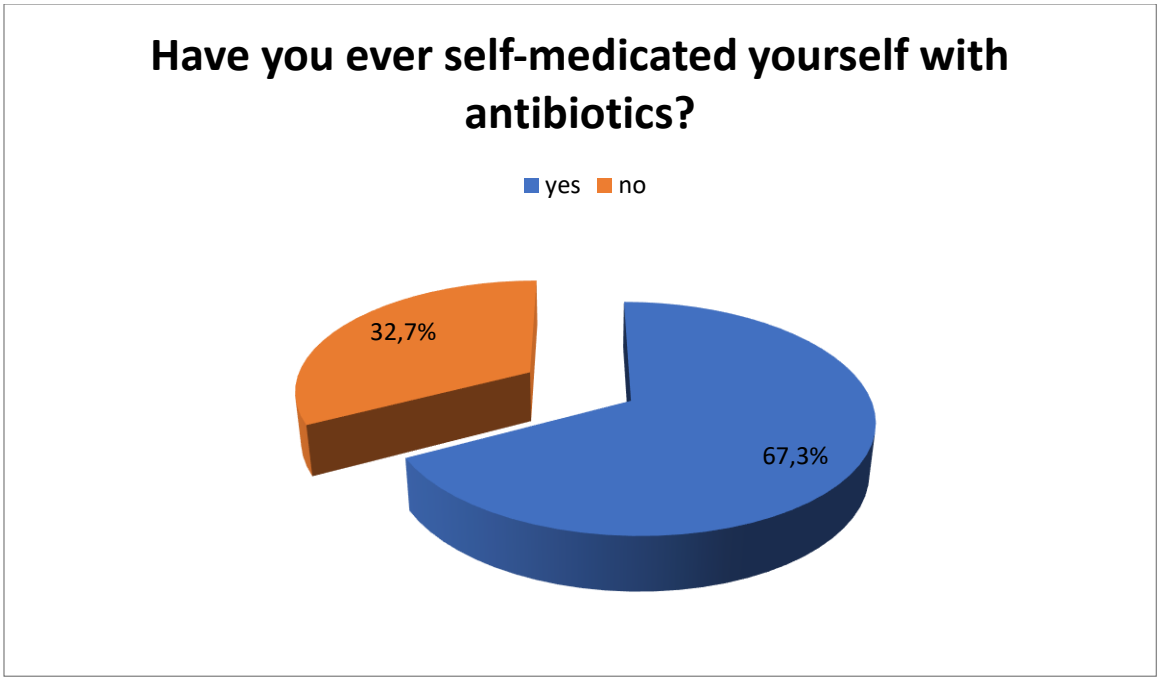

Figure 32: Percentages of self-consumption of antibiotics

2. Were you sure of the type of infection (bacterial infection)?
   - Yes
   - No

➢ A percentage of 34.8%, which is equivalent to 62 people, answered "yes," and a percentage of 65.2%, which is 116 people, answered "no."

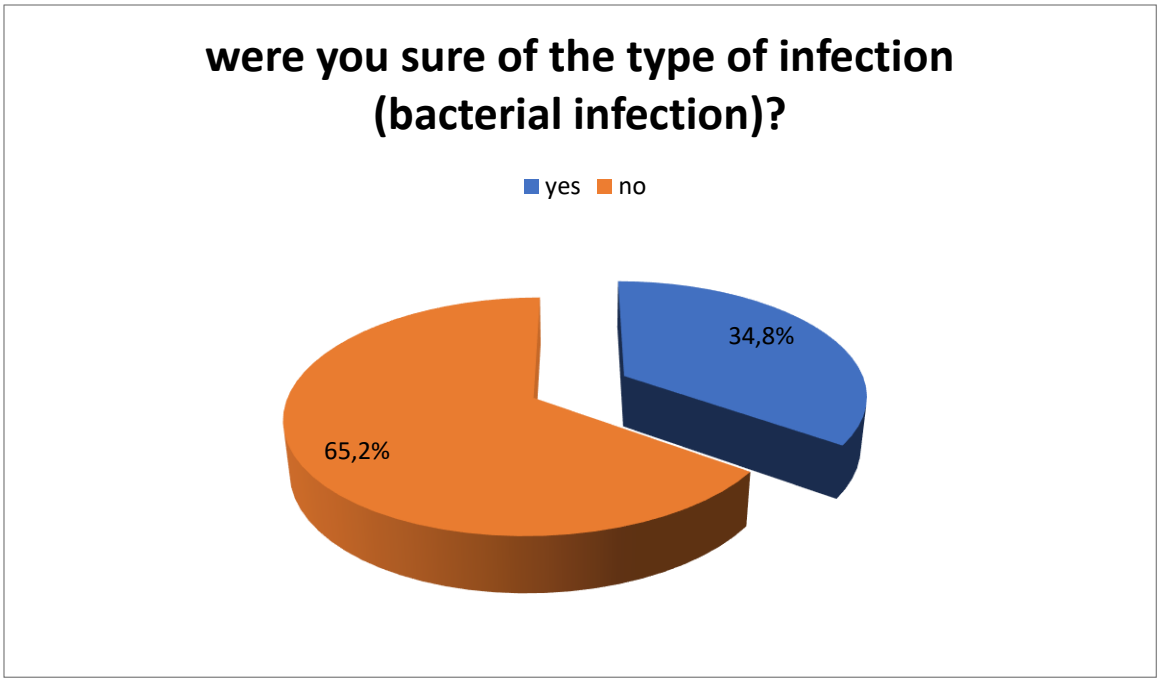

Figure 32: Percentages of self- diagnosis

3. How did you know the dosage of antibiotics?
    - By checking the prescribing information
    - Internet
    - Consulting pharmacist or doctor
    - Consulting family or friend
    - Guessing the dosage by myself
    - Previous experience

➢ 56, 6% of the respondents (107 people) obtained the dosage information by checking the prescribing information. Approximately 30, 26% (57 people) relied on the internet for this information. Consulting a pharmacist or doctor was the primary source for 43, 9% (83 people) of the respondents. Family or friends were consulted by 31, 2% (59 people) of the respondents. Guessing the dosage by themselves was the approach taken by 28% (53 people). Finally, 41, 3% (78 people) relied on their previous experience.

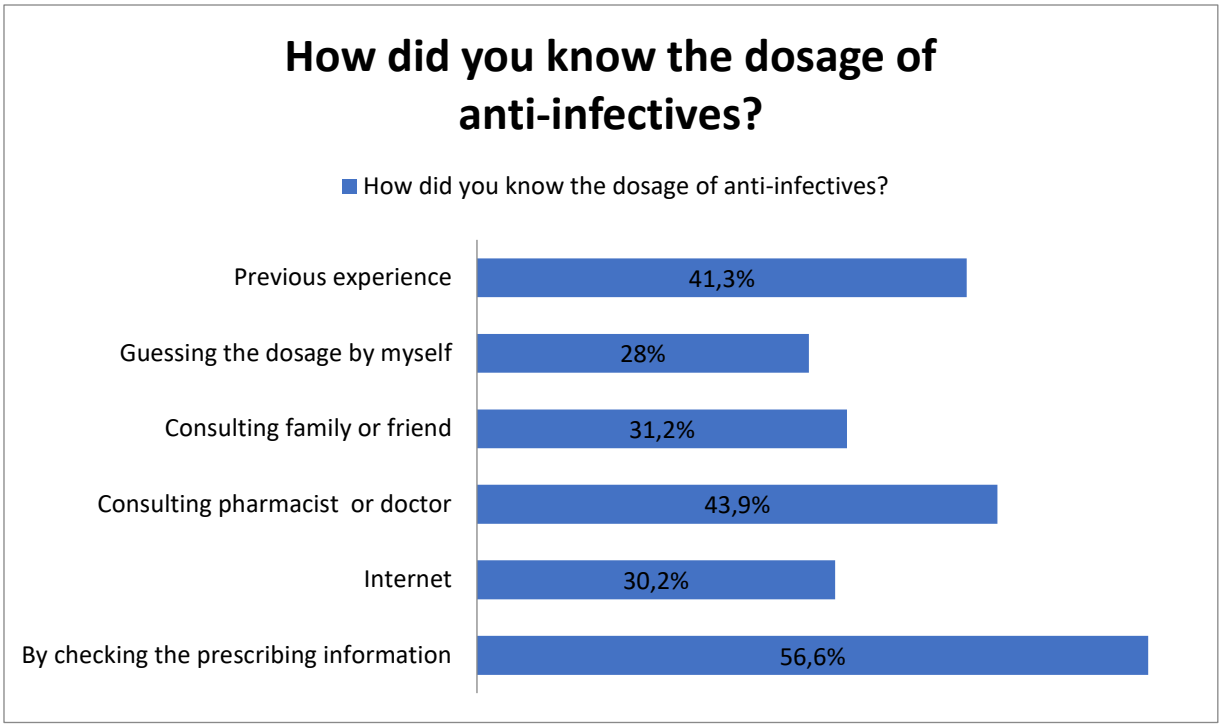

Figure 33: Distribution of self- diagnosis

4. Did you ever change the dosage of antibiotics during the course of self-medication?
    - Do not know
    - No
    - Yes
    - sometime

➢ Approximately 33% of the respondents (63 people) answered "yes" indicating that they did change the dosage of antibiotics. Similarly, 33% (63 people) responded with "sometime" suggesting that they occasionally modified the dosage. On the other hand, 27, 2% (52 people) answered "no," indicating that they did not change the dosage. Finally, 6, 8% (13 people) responded with "do not know," implying uncertainty about whether the dosage was altered during self-medication.

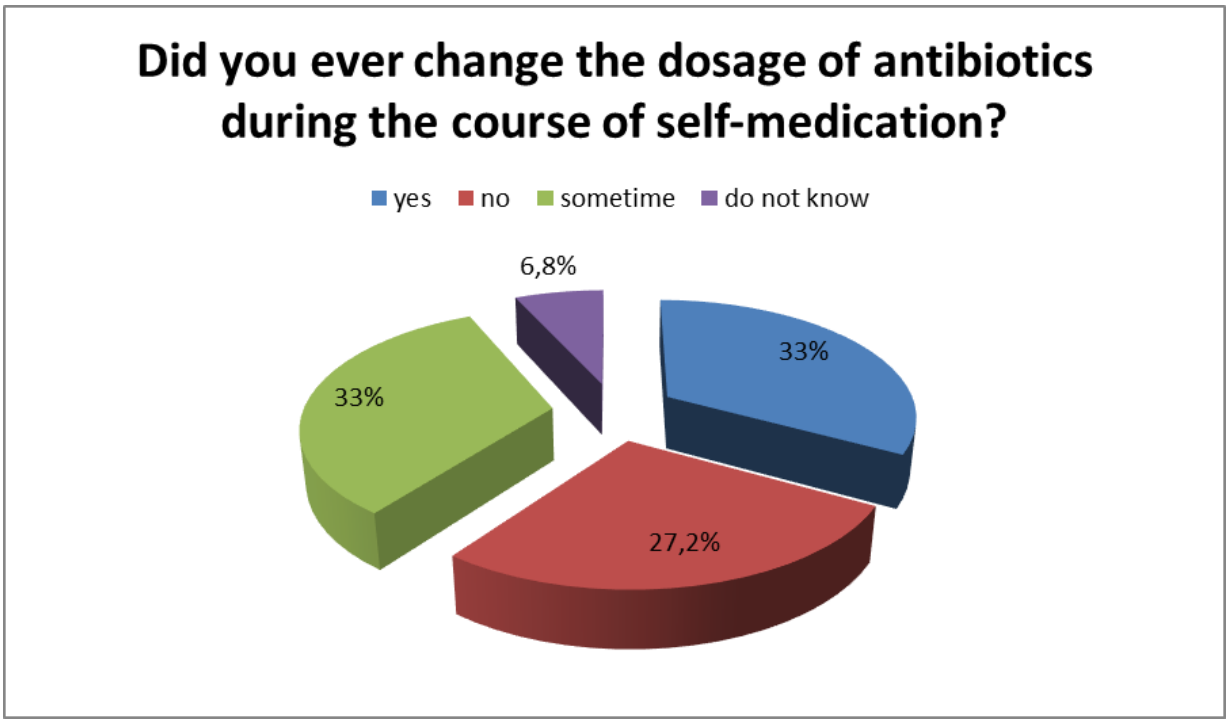

Figure 34: The percentage of individuals who have change the dosage of antibiotics

5. Why did you change the dosage of antibiotics during the course of self-medication?
    - To reduce adverse events
    - Health improved
    - Disease worsened
    - Other

➢ Approximately 83, 5% of the respondents (116 people) reported that their health improved as a result of changing the dosage. Around 43, 9% (61 people) stated that their disease worsened, leading them to modify the dosage. To reduce adverse events was the reason given by 33, 8% (47 people) of the respondents. Lastly, 10, 8% (15 people) indicated "other" reasons for changing the dosage.

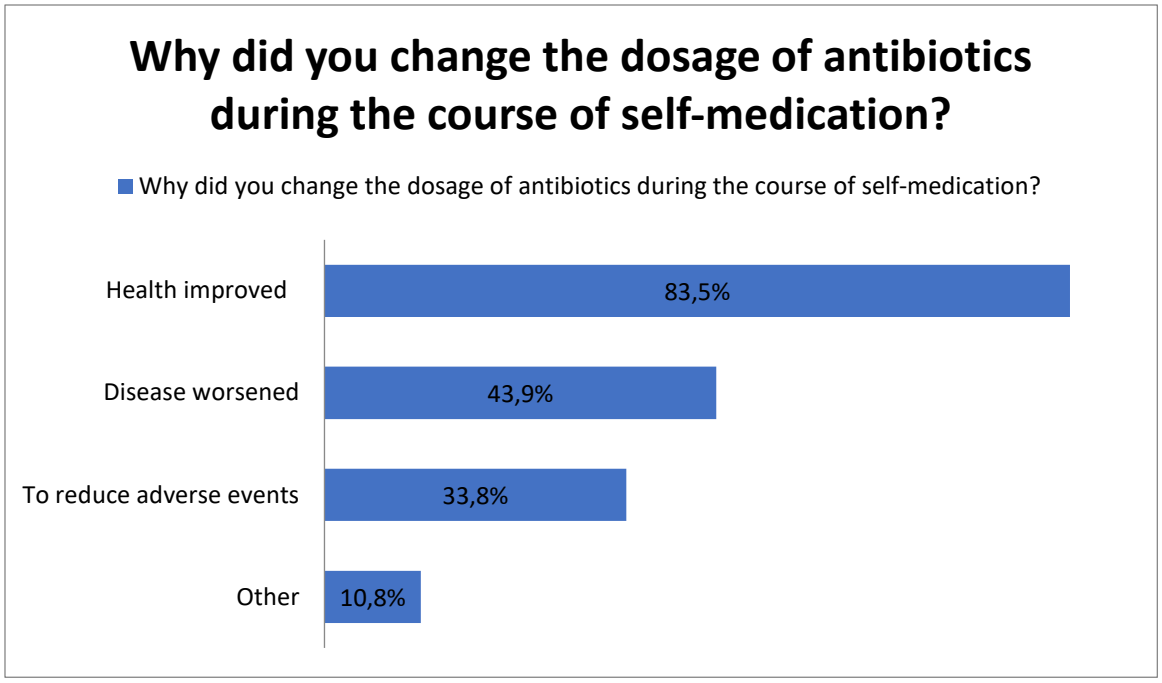

Figure 35: The percentage of reasons for changing the dosage during treatment

6. When disease worsened did you change the antibiotics?
    - Yes
    - No

➢ 105 (57, 4%) people answered "yes," and 78(42, 6%) people answered "no."

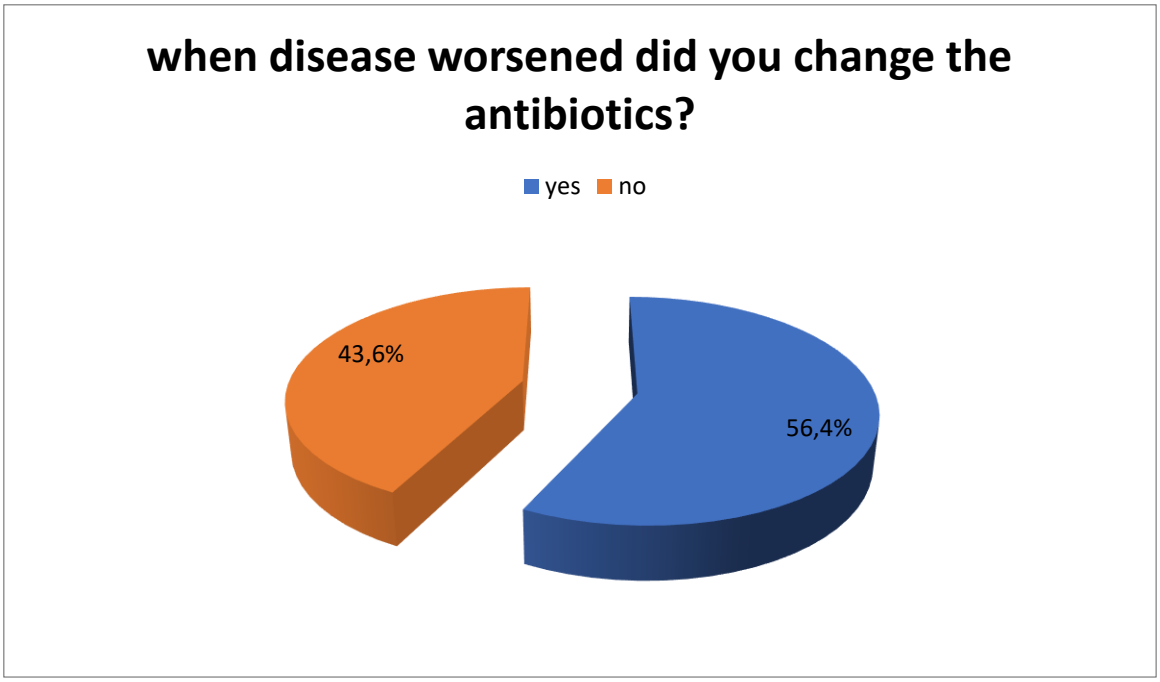

Figure 36: The percentage of individuals who have change the antibiotics

7. Have you been educated about antibiotic resistance?
    - Yes
    - No

➢ The majority answered "no" (114 people), while the remaining (88 people) answered "yes."

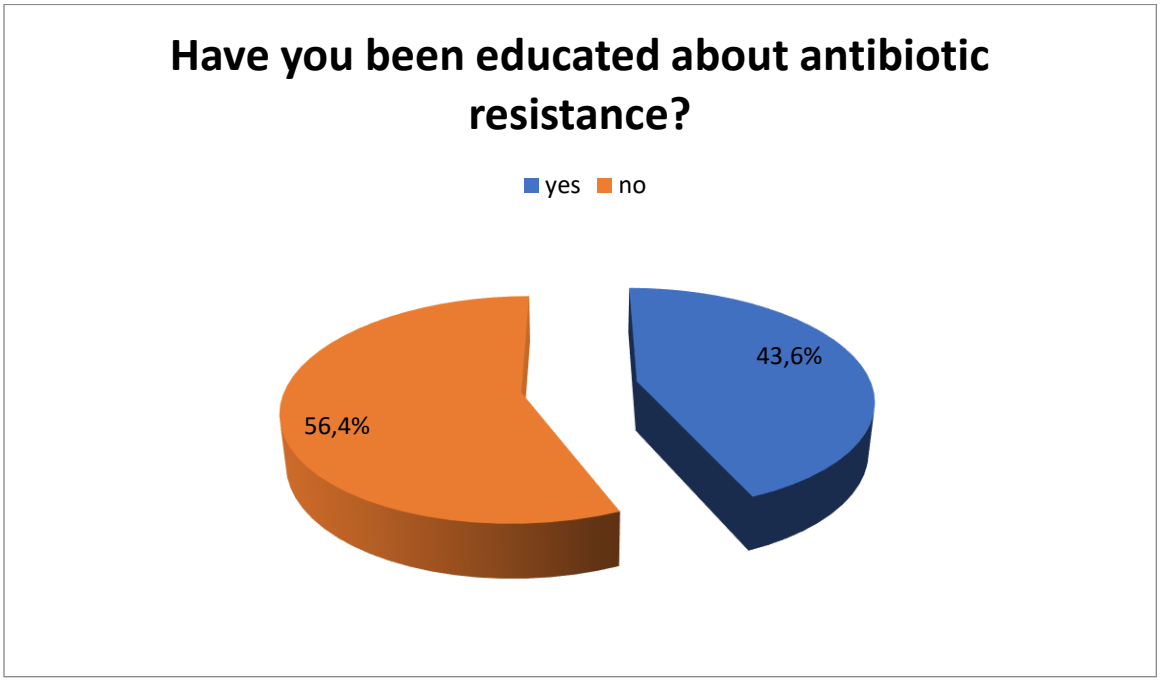

Figure 37: The percentage of individuals who have been educated about antibiotic resistance

2. Self-Medication habits with vitamin and mineral

1. Do you use these medications for self-medication ?

- Vitamin C
    - Yes
    - No
- Zinc
    - Yes
    - No
- vitamin d
    - Yes
    - No
- magnesium
    - Yes

- No

➢ Vitamin C: 94.1% answered "yes," and the remaining percentage answered "no."

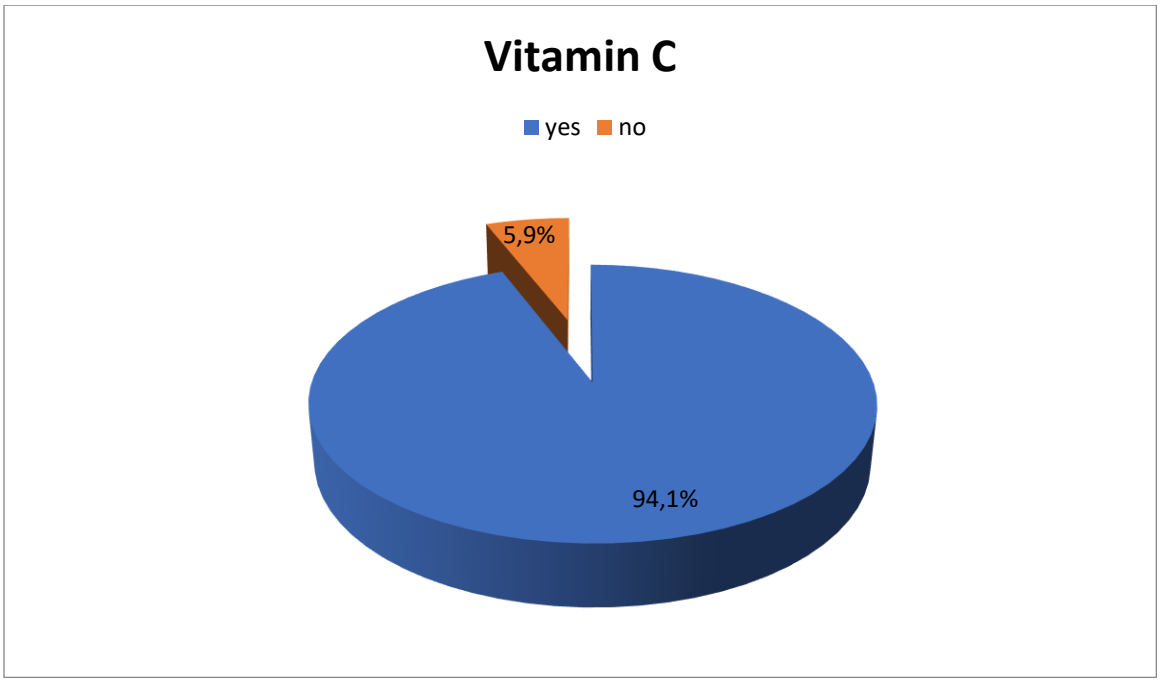

Figure 38: Percentages of self-consumption of vitamin c

➢ Zinc: 78.2% of the responses were "yes," which means that 158 people answered "yes," and the percentage of 21.8% (44 people) answered "no."

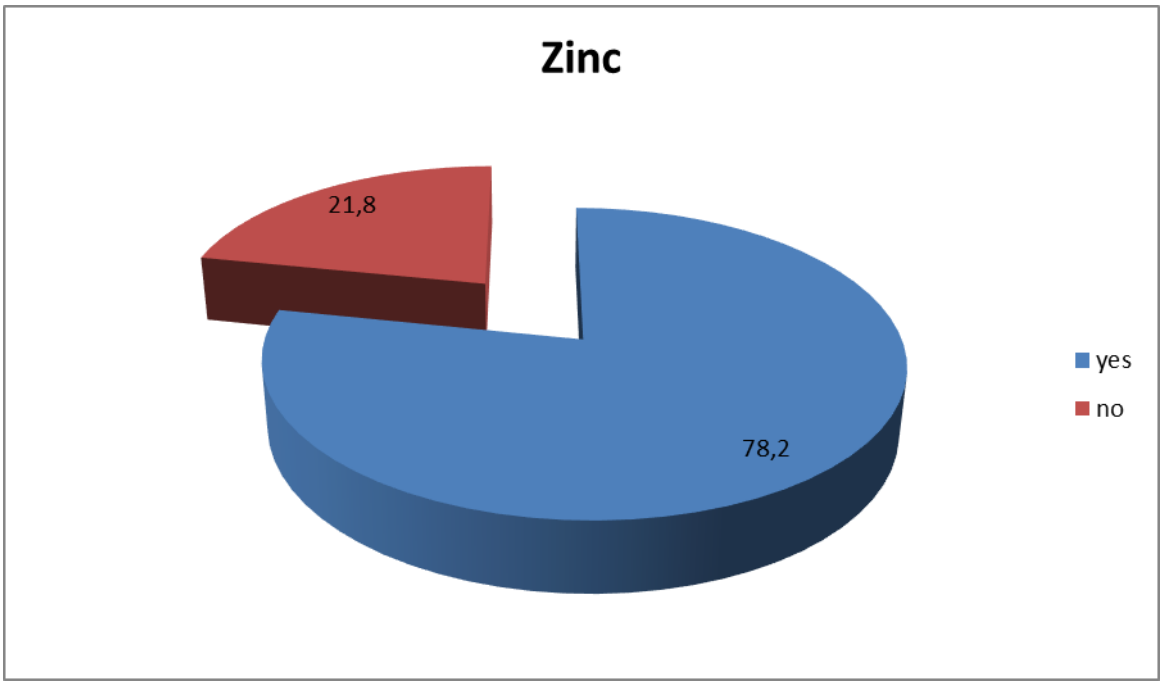

Figure 39: Percentages of self-consumption of zinc

- Vitamin D: 117 people take vitamin D, which represents 57.9%, while the remaining 85(42, 1%) people do not take it.

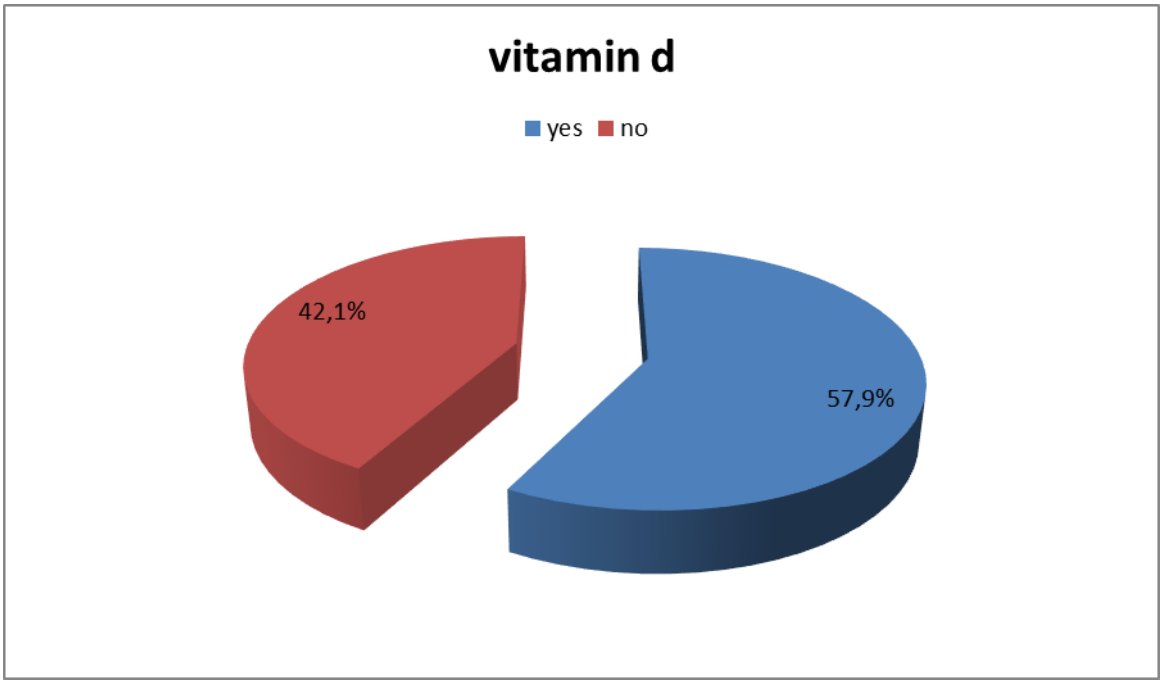

Figure 40: Percentages of self-consumption of vitamin d

- Magnesium: 72.8% of the responses take magnesium, and the remaining percentage answered that they do not take it.

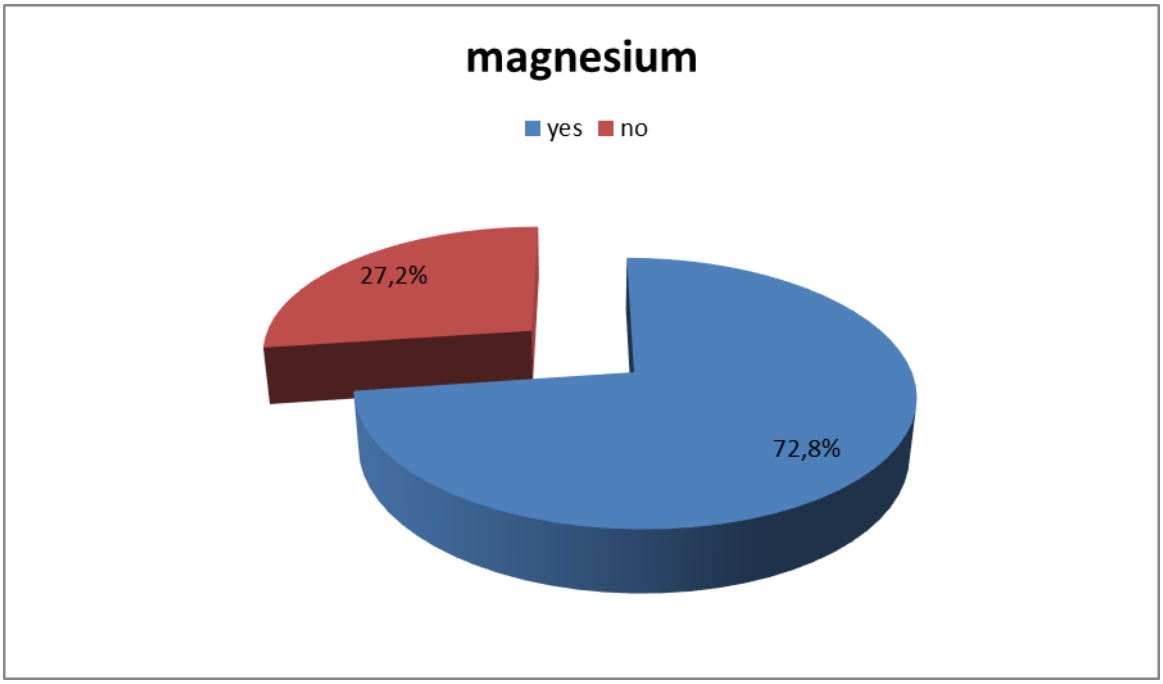

Figure 41: Percentages of self-consumption of magnesium

2. What was your reason for self-medication?
    - Advertisement
    - Used by peers – friends / family
    - High fees of doctor
    - Other

➢ The reasons for self-medication were gathered from the responses of 202 people. Among them, 68 people (34,5%)mentioned that they were influenced by advertisements. 106 people(53,8%) reported that they used medication based on recommendations from their peers, friends, or family. 61 people (31%)stated that the high fees charged by doctors led them to self-medicate. Additionally, 77 people (39, 1%) provided other reasons for their self-medication practices.

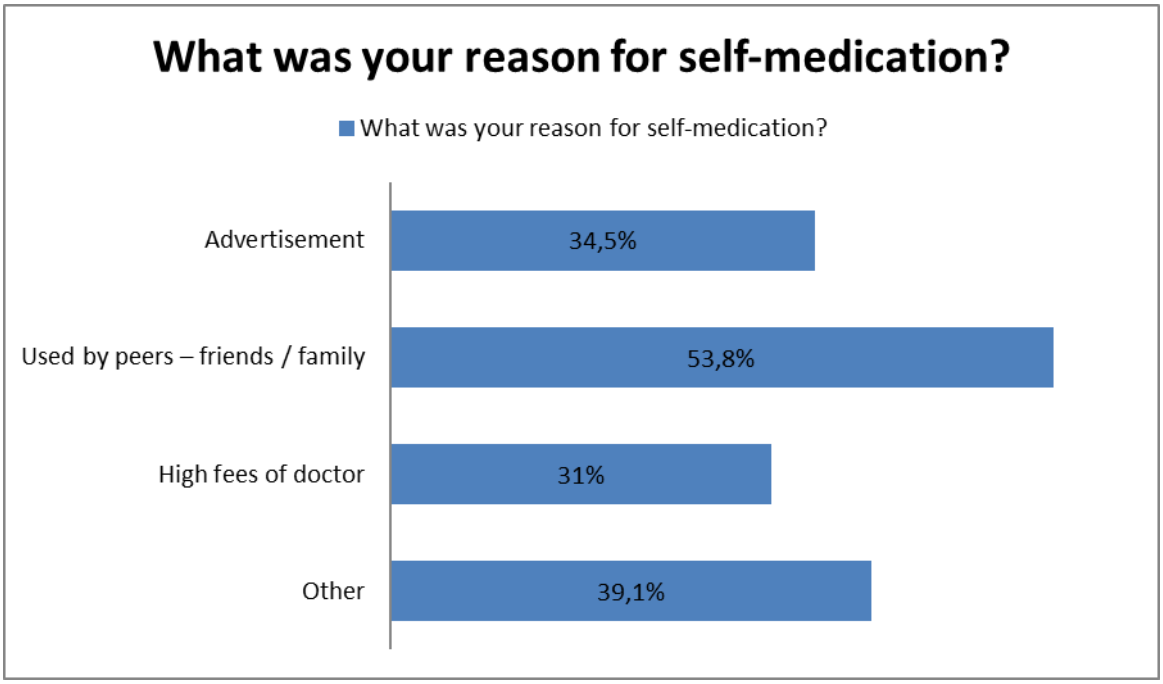

Figure 42: the percentage of self-medication reasons

3. Have you ever experienced adverse events with self-medication?
    - Yes
    - No

➢ 42 people (21, 3%) answered "yes," and 155 people (78, 7%) answered "no."

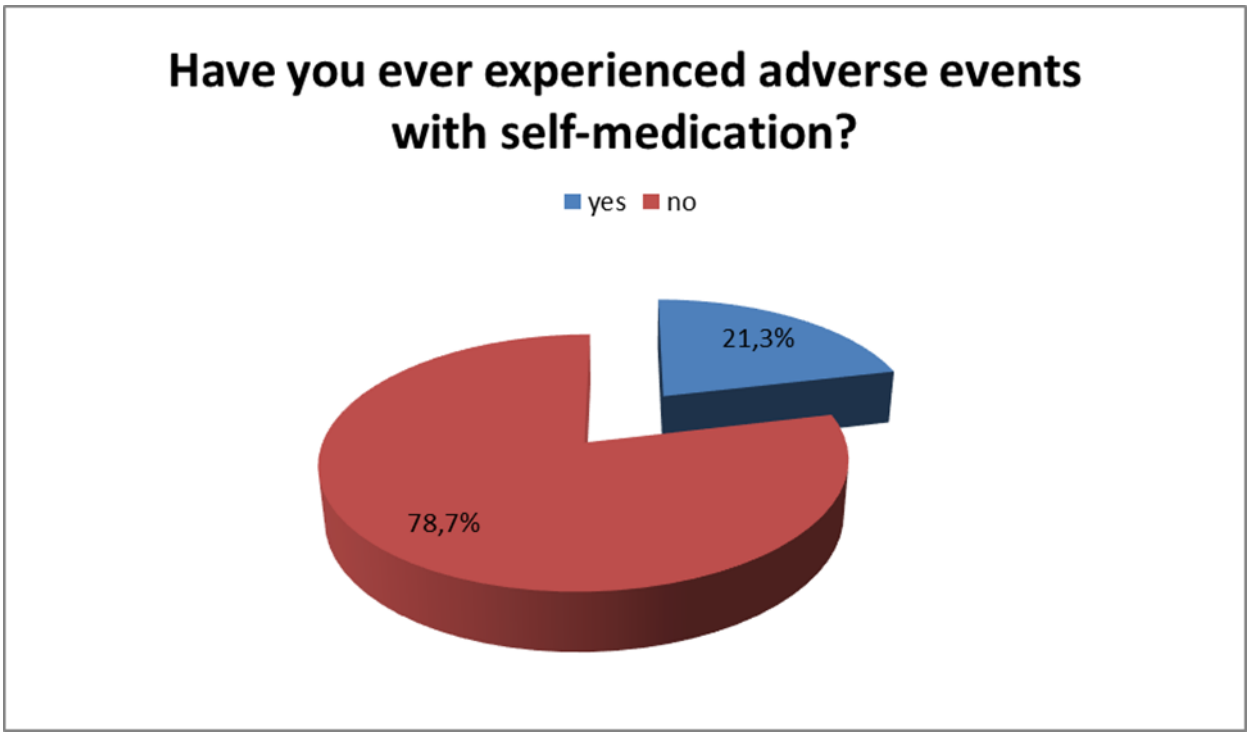

Figure 43: The percentage of individuals who have experienced adverse events

4. If your answer is yes, what is it?
    - Headache or Dizziness
    - Palpitations
    - Hypertension
    - Other complications

➢ The adverse events reported with self-medication were obtained from the responses of individuals. Among the respondents, 25 people (53, 2%) experienced headache or dizziness as a result of self-medication. Palpitations were reported by 30 people (63, 8%), while 17 people (36, 2%) mentioned experiencing hypertension. Additionally, 13 people (27, 7%) reported other complications associated with self-medication.

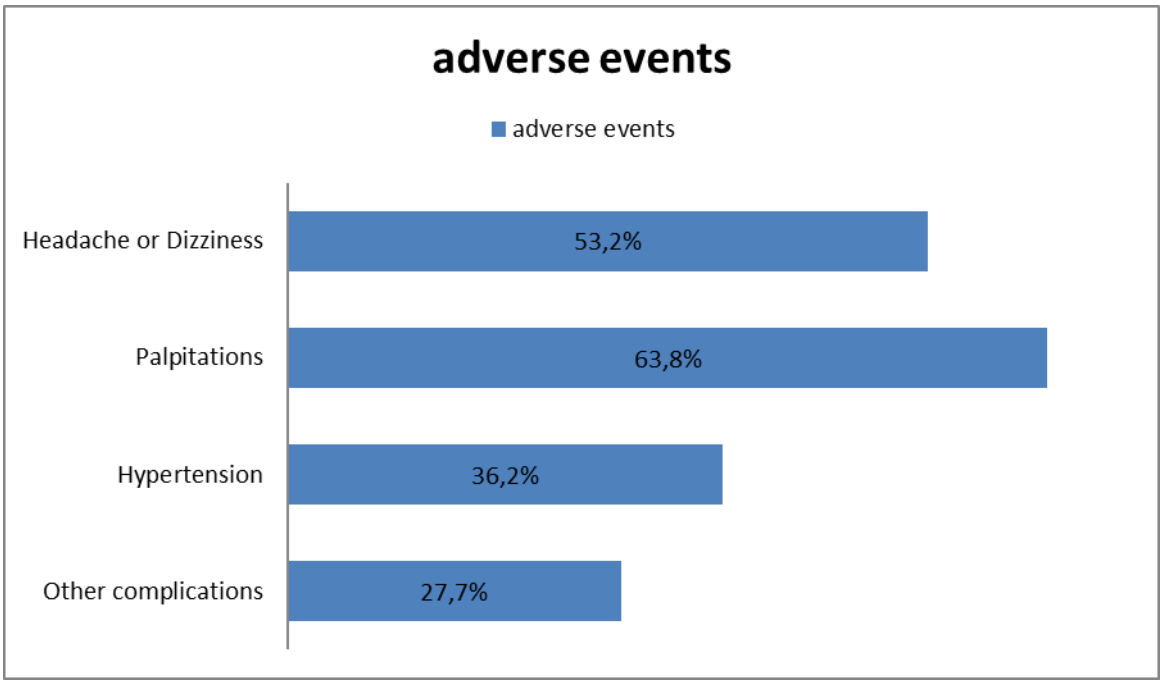

Figure 44: The percentage of different adverse events in self-medication

2. Results of the survey among community pharmacists

1. Based on your experience as an Algerian pharmacist, does the rate of self-medication increase or decrease?
    - Increase
    - Decrease

➢ 90% of the surveyed pharmacists say that the phenomenon of self-medication is increasing since they started practicing, while 10% say it is decreasing

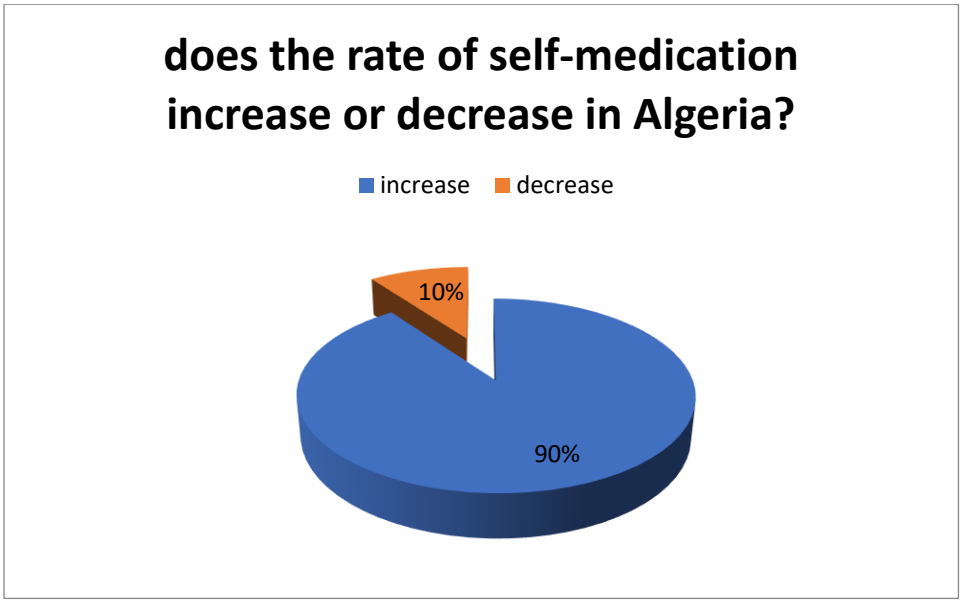

Figure 45: The evolution of self-medication practice

2. What is the frequency of self-medication among Algerian citizens?
    - Once a day
    - Once a week
    - Once a month
    - Once a year

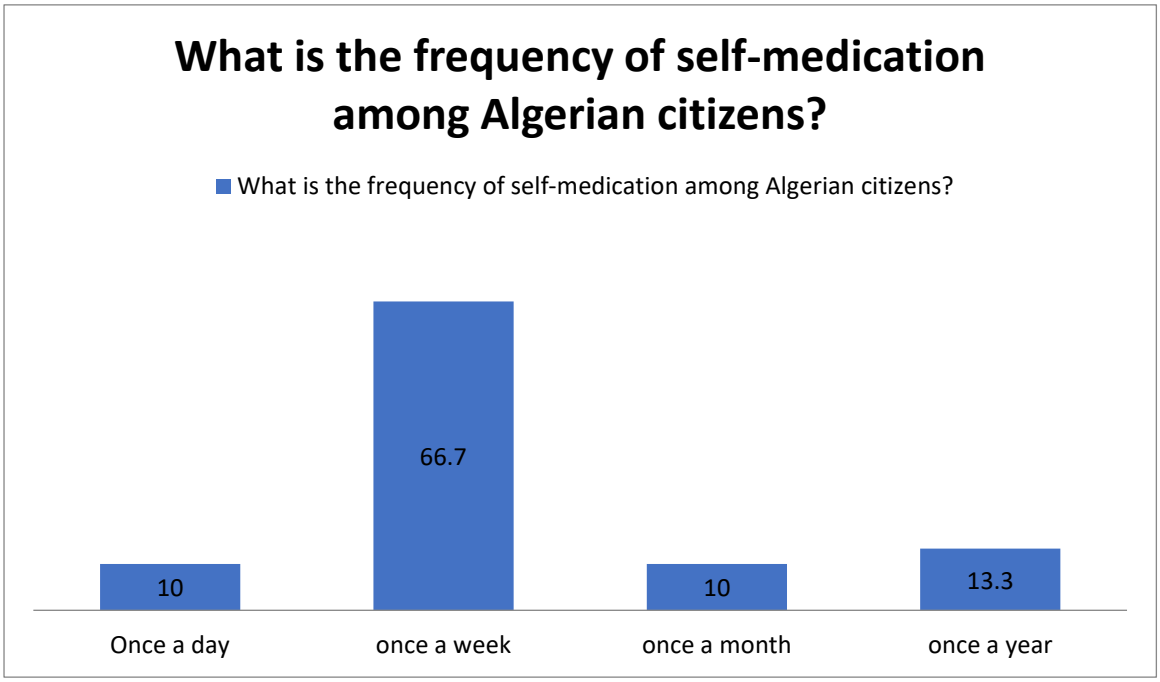

Figure 46: Frequency of self-medication usage

1. On average, how many medications do not require a prescription?
    - From 0 to 5
    - From 5 to 10
    - From 10 to 15
    - More than 15

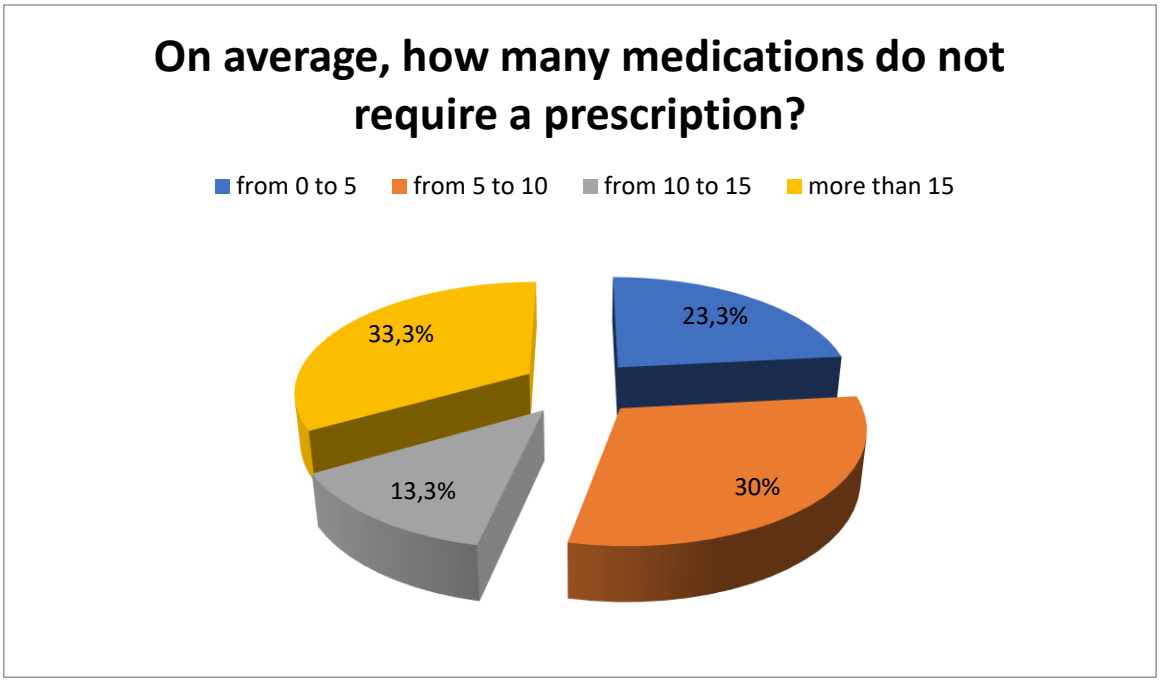

Figure 47: Frequency of self-medication usage.

2. What are the best-selling medications without a prescription?

    - Analgesics
    - Corticosteroid
    - Anti-inflammatory
    - Antibiotics

➢ We have represented the different medications most commonly used in self-medication practice. We have transformed the data we obtained into percentages.

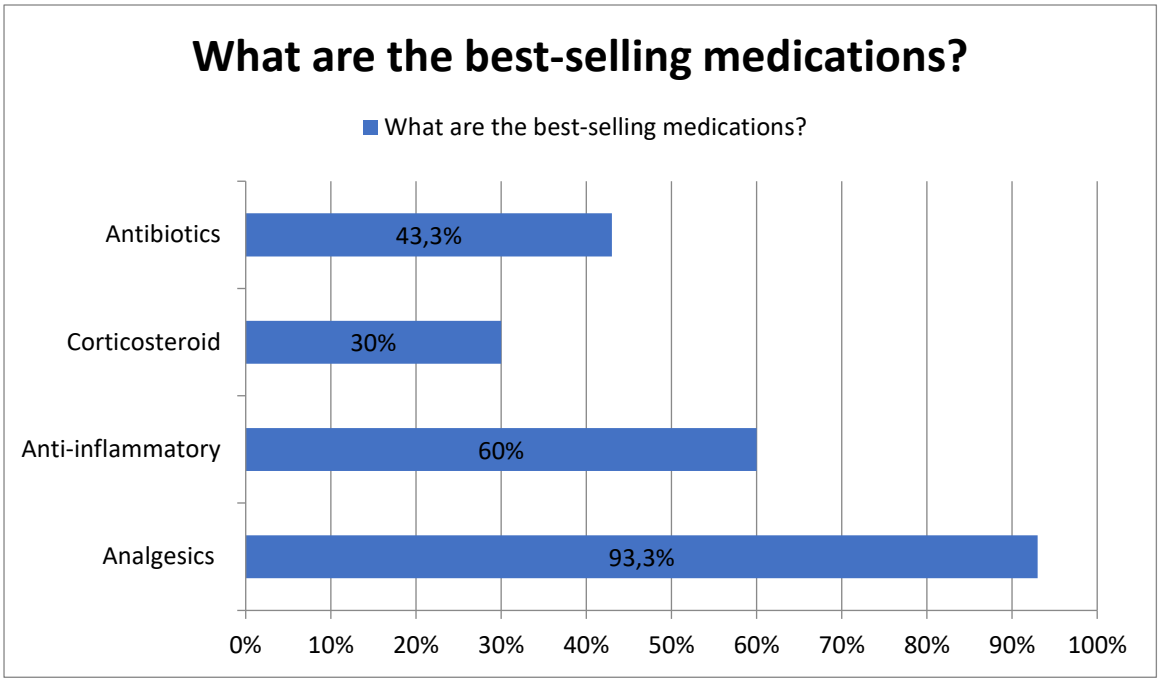

Figure 48: Distribution of best-selling medications

3. What are the best-selling vitamins and minerals without a prescription?
    - Vitamin C
    - Zinc
    - vitamin d
    - magnesium

➢ We have represented the different vitamins and minerals most commonly used in self-medication practice. We have transformed the data we obtained into percentages.

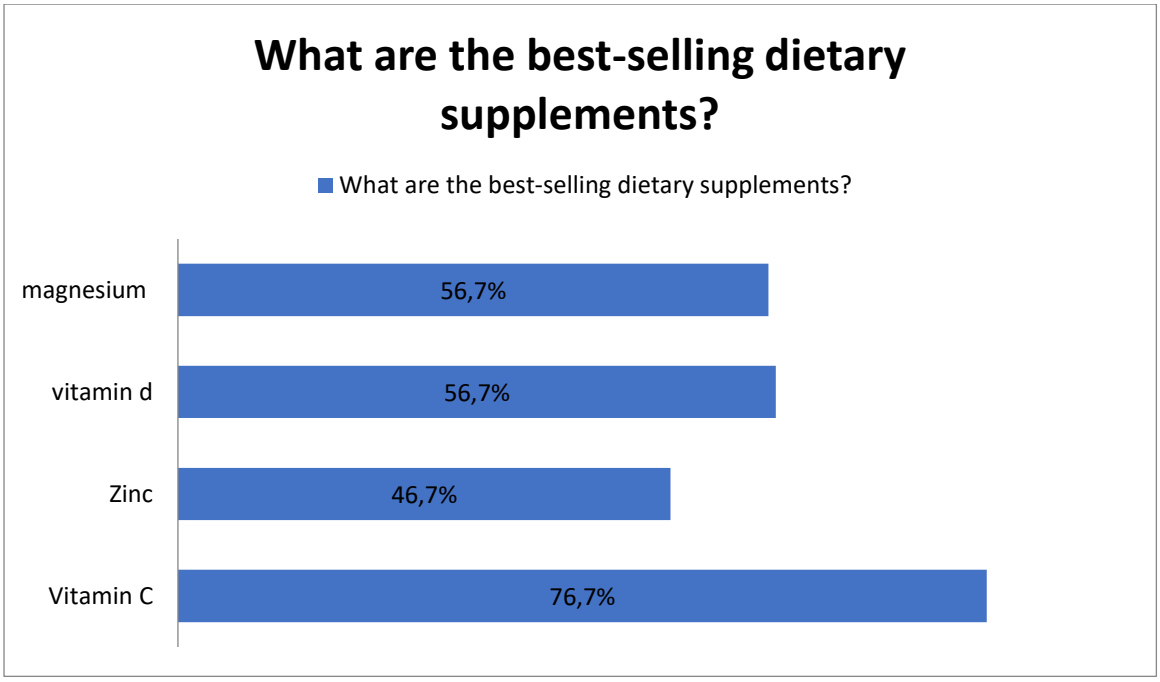

Figure 49: Distribution of best-selling vitamins and minerals

4. What are the top-selling medications, Are they expensive or affordable?
    - Expensive
    - Affordable

➢ 93.3% of the surveyed pharmacists say that top-selling medications are affordable, while 6.7% consider the expensive is more top-selling

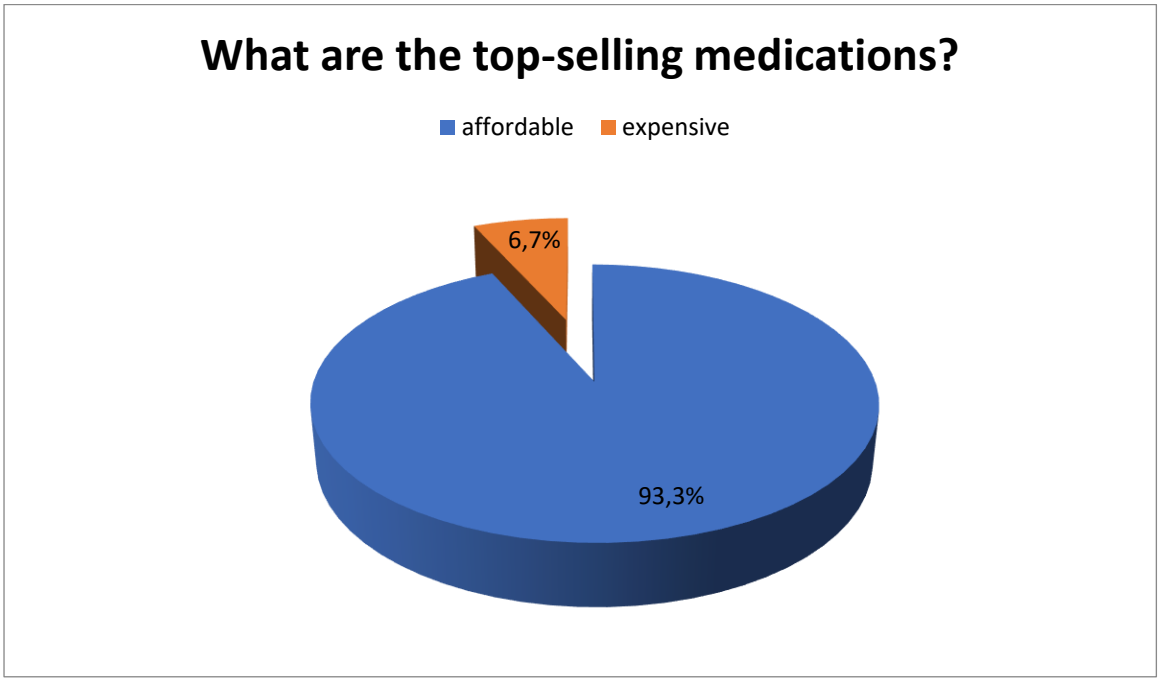

Figure 50: Distribution of best-selling medications

II. Discussions

1. Hardship

Some of the difficulties we faced in the survey include:

- Limited internet usage: Some older adults do not use the internet, which forced us to fill out the survey on their behalf based on their answers.
- Fear of hacking: When sharing the survey with some individuals, they refused to respond due to concerns about it being a hacking site or compromising their personal information.-Lack of participation: Some people may perceive the survey as a waste of time and internet resources, leading to a low response rate.
- Lack of awareness about self-medication: Some individuals may not be aware of the concept of self-medication, and they may believe that paracetamol, for example, is not a drug and cannot be harmful.

2. Discussions

2.1. Self-medication and age:

Self-medication is widespread in Algeria across all age groups, with a significant predominance among those under 30 years old, accounting for 76.73%. This can be attributed to factors such as lack of time, financial constraints to visit a doctor, and the level of education that enables them to rely on their own knowledge.

Among individuals aged between 30 and 50 years old, a rate of 12.87% was observed, which is also noteworthy. At this age range, certain ailments and conditions may arise that do not necessarily prompt individuals to seek medical consultation but rather lead them to resort to self-medication. Additionally, many individuals in this age group rely on past experiences and previous prescriptions.

For individuals above 50 years old, the rate of self-medication is the lowest, at 10.39%. Studies have consistently shown that self-medication is less frequent among the elderly, who tend to lean more towards alternative medicines such as herbal remedies. This can be attributed to the fact that most individuals in this age category are already receiving treatment for various chronic conditions or other ailments, making them hesitant to add additional medications without consulting their doctors.

A survey conducted by Raynaud in 2008 supports these findings, stating that "the highest rates of self-medication occur during active ages, with a peak between 40 and 50 years old, and the probability of self-medication decreases with age, both for men and women" [58]. Similarly, another survey conducted in the city of Fes revealed that the age group from 18 to 45 years old (young adults) represents almost 75% of people who reported resorting to self-medication [59].

2.2. Self-medication and gender:

Our survey revealed that 61.4% of women compared to 38.6% of men practice self-medication. This indicates a higher prevalence of self-medication among women, which is consistent with findings from multiple studies [60]. Although self-medication is applicable to both sexes, it is more commonly practiced by women.

There are several factors that can explain this result. Firstly, women often acquire medication for self-medication not only for themselves but also for their children, increasing their involvement in self-medication practices. Additionally, factors such as the unique physiology of women and the focus on beauty (in cosmetics) contribute to their higher rates of self-medication. Furthermore, gynecological issues may make women hesitant to consult a doctor or seek advice from pharmacists, leading them to rely on self-medication as their primary choice of treatment.

A study conducted by P. Villani and G. Bouvenot from the Faculty of Medicine in Marseille in 2005 found that the female clientele proportionally exceeded that of men, with 80% of women and 70% of men engaging in self-medication [61]. These findings further support the higher prevalence of self-medication among women.

2.3. Self-medication and marital status:

Single individuals resort to self-medication (72.8%) more than married individuals (26.2%) due to factors such as limited emotional and social support, increased stress levels from managing responsibilities alone, limited access to healthcare, feelings of loneliness and isolation, and their preference to save money for building their future instead of visiting a doctor and undergoing examinations.

2.4. Self-medication according to the level of education:

In the study area, the majority of participants in the study are university students, accounting for 51.1% of self-medication cases. This is because they are financially dependent and cannot afford medical consultations. They also lack time and believe they can diagnose themselves based on their knowledge. On the other hand, individuals with a high school diploma represent 26.2% of cases, while those with a Ph.D. represent 5.9%, indicating a lower percentage compared to university students who are more aware of the risks of self-medication. High school students account for 7.9% of cases, middle school students account for 5%, and primary school students account for 3.5%, reflecting lower percentages as they are not in a stage where they can make decisions and do not take medication without the permission of their guardians.

This indicates that the phenomenon of self-medication is proportional to the level of education. A study conducted in the wilayas of Tlemcen showed similar results: individuals with a university education predominantly practice self-medication with a rate of 46.04% [62].

The survey included a total of 169 college students, and the results show that 27.2% of them are studying medical courses, 4.1% are studying paramedical courses, and 68.6% are pursuing other courses.

Interpreting these results, it can be observed that a significant portion of the surveyed college students are studying in the medical field, including medical and paramedical courses. This suggests that these students may have a higher level of knowledge and awareness regarding healthcare and medication, which could potentially influence their attitudes towards self-medication.

On the other hand, the majority of the college students surveyed are pursuing courses in fields other than medicine. This group may have less exposure to medical knowledge and may rely more on self-medication due to various factors such as convenience, lack of access to healthcare professionals, or limited awareness of potential risks.

Overall, these results indicate that the field of study among college students can have an impact on their tendency towards self-medication, with those studying medical courses potentially being more cautious and less likely to engage in self-medication compared to those in other fields of study.

37 individuals responded as graduates, 11 (22.91%) individuals work in the medical sector, and 37 (77.08%) individuals work in another sector.

As mentioned in the previous interpretation, the higher the percentage of individuals working in the medical sector, the greater their awareness of self-medication.

A study conducted in the province of Tizi-Ouzou has demonstrated similar results: individuals with a medical background or those surrounded by people working in the medical field practice self-medication less [15].

2.5. Self-medication and the medicines used in self-medication

According to a study we conducted, we observed that the Algerian population uses a significant number of medications and vitamins for self-medication. About 95% of them take Paracetamol, 37.6% engage in self-medication with corticosteroids, and 62.4% take anti-inflammatory drugs. Antibiotics are also commonly used, with a usage rate of 67.3% among the population. When it comes to vitamins, Vitamin C is at the forefront with a rate of 94.1%, followed by Zinc at 78.2%, Magnesium at 72.8%, and lastly, Vitamin D at 57.9%. The rate of self-medication has been increasing in recent years, as indicated by the opinions of surveyed pharmacists in Algeria. 90% of the 30 pharmacists interviewed stated that self-medication is on the rise. The study also identified some of the most commonly used drug classes for self-medication by the Algerian population and Algerian pharmacists.

The Algerian society suffers from a lack of medical awareness, which explains their irrational use of self-medication. The study highlighted that Algerians use paracetamol in excessive amounts. This finding is also supported by a study conducted in 2022 in the Tizi-Ouzou province in Algeria, as well as other studies [59] [63] [64]. The lack of medical awareness remains a significant problem faced by Algerians, as 65.3% are unaware of the risks of self-medication. Pharmacists have informed us that some teenagers, in particular, are using corticosteroid medications to increase their weight without realizing the serious consequences. Even in their use of antibiotics, we observe a lack of awareness. A significant proportion of our study, 56.4%, had never heard of antibiotic resistance.

Pain, such as headaches, toothaches, and joint pain, and the necessity of continuing work, force people to resort to consuming pain relievers such as Paracetamol and anti-inflammatory drugs, even for minor pain, as they have become a habit for them. During certain disease

seasons like influenza, especially during the COVID-19 period, a significant increase in self-medication has been noticed, particularly with antibiotics and Paracetamol. This irrational rise applies not only to the general public but even to doctors who, due to their unfamiliarity with the new virus (COVID-19), prescribe the same formula: an antibiotic and a fever reducer. As a result, people have started buying these medications without seeking medical advice.

One of the main reasons for the significant increase in various medications such as painkillers, anti-inflammatory drugs, corticosteroids, and antibiotics is their availability in various Algerian pharmacies without a prescription. Even the Algerian law contributes to this, as there are medications allowed to be purchased without a prescription. Whereas 33.3% of pharmacists sell more than 15 medications without a prescription, such as Paracetamol. This explains the irrational consumption of these medications. Additionally, we have observed that over-the-counter medications are relatively inexpensive for citizens, as reported by Algerian pharmacists, with sales of low-cost medications accounting for 93.3% compared to high-cost medications, which constitute 6.7% of sales.

The Algerian population also uses vitamins such as vitamin C, vitamin D, magnesium, and zinc for self-medication to boost their immune system, address deficiencies, support overall health, and potentially alleviate symptoms of specific conditions. These vitamins are readily available, and individuals often perceive them as a convenient and accessible way to take control of their health.

Another factor that contributes to people's inclination towards self-medication is the reuse of the same prescription.

2.6. The reasons for self-medication

According to the study, there are several reasons that drive people in Algerian society to self-medicate. One influential factor is advertisements, both on television and social media. The promotion of medications and vitamins in these advertisements leads to 34.5% of respondents consuming vitamins based on their influence, without the need for a doctor's consultation. Recommendations from family and friends also play a significant role, with 40% of respondents relying on self-medication when purchasing painkillers, antibiotics, anti-inflammatory drugs, and corticosteroids. Furthermore, 53.8% of respondents resort to self-medication when buying vitamins based on advice from family and friends, highlighting the strong influence of the individual's environment.

The high fees charged by doctors are another reason that forces people to turn to self-medication. As medical consultations are often beyond their financial capabilities, 39% of respondents purchase medications without seeking medical consultation to avoid the cost of a doctor's visit. A similar pattern is observed with vitamins, as 31% of respondents consume them without seeking medical advice to avoid the cost of a medical consultation.

Time constraints also contribute to the inclination towards self-medication, particularly among busy individuals. Approximately 44% of the study participants stated that they consider going to the doctor, scheduling an appointment, and waiting as time-consuming activities. Therefore, they opt for self-medication instead.

Keeping old prescriptions and purchasing the same medications without consulting a doctor is a common practice among various segments of the Algerian population. Around 45% of respondents admitted to this behavior, using the medication directly whenever they experience any pain.

A study conducted in Tlemcen on self-medication produced similar results to the one mentioned above. It found that 24.12% of patients believe they resort to self-medication to save time, while 13.57% do so to avoid paying consultation fees [16].

2.7. Adverse events of self-medication

According to our study, we observed a high rate of self-medication, with Algerian pharmacists reporting that 66.7% of individuals engage in self-medication once a week, and 10% do so every day. The problem lies not only in the frequency of self-medication but also in the fact that 10.4% of individuals do not read the instructions of prescribing information. Additionally, 38.1% sometimes read it, while other times they do not. Moreover, 28.9% do not understand the instructions of prescribing information.

Furthermore, only 65.3% follow the instructions provided in the package insert, while 34.7% do not adhere to them. As a result, 36.5% of individuals have experienced side effects due to the medications they have taken.

Among the reported side effects experienced by the Algerian population, 57.3% have experienced increased hyperglycemia, and 53.3% have experienced hypertension as a result of the irrational use of corticosteroids. 9.3% experienced bleeding as a result of using anti-

inflammatory drugs such as aspirin. Allergy is another common side effect of medications, with 53.3% experiencing medication allergies. This includes individual sensitivity to certain antibiotics such as penicillin.

In addition to this, 21.3% experienced side effects from using vitamins, including undesirable effects such as headaches, palpitations, and high blood pressure.

The greatest danger and consequence of self-medication are antibiotic resistance. According to the study, 67.3% of individuals consume antibiotics through self-medication, and 65.2% of them are unsure if it is a bacterial infection. The biggest problem is that even the dosage of antibiotics is not obtained from a reliable source like a doctor or pharmacist (only 43.9% consult a doctor or pharmacist). Instead, they obtain antibiotics from the internet (30.2%), self-administer based on their mood (28%), or seek advice from their family or friends (31.2%). Some individuals rely on the information inside the medication packaging (56.6%).

Not only that, but 33% change the dosage while self-medicating, and another 33% sometimes change it. Additionally, 6.8% are not even aware that they have changed the dosage. 83.5% change the dosage if their condition improves, and 43.9% change it if their condition worsens, while 33.8% change it to reduce the side effects of the antibiotic.

The issue doesn't stop at changing the dosage of the same antibiotic; they also switch to a different antibiotic altogether (56.4% completely change the antibiotic) without considering the danger of antibiotic resistance. In fact, 43.6% have not even heard that antibiotics can lead to resistance. These results are very alarming and explain the widespread antibiotic resistance in Algeria.

The rapid evolution of bacterial resistance to antibiotics is currently a concerning phenomenon in developing countries, where antibiotic-resistant pathogens may have a higher prevalence in certain African countries [64]. Algeria, a country in North Africa, is facing a worrying situation regarding recent antibiotic resistance data. Indeed, the past decade has been marked by the emergence and spread of new resistance genes, especially in the northern part of the country [66].

2.8. The responsibility of self-medication

The Algerian law allowing the sale of drugs without a prescription is a contributing factor to self-medication. It is noteworthy that 33.3% of pharmacists sell more than 15 medications without a prescription. Additionally, the Algerian law permits television and online advertisements promoting vitamins, which has led to an observed influence on 34.5% of Algerians who purchase vitamins due to these advertisements.

The prevalence of self-medication is also influenced by Algerian doctors, as a notable portion of the population turns to self-medication due to the financial burden associated with medical consultations. It is important to note that healthcare providers play a crucial role in addressing the issue of self-medication, as there is room for improvement in patient education regarding the importance of seeking updated medical advice and avoiding reliance on outdated prescriptions. In our study, a significant percentage of participants (65.3%) were found to lack awareness about the risks associated with self-medication, which highlights the need for increased attention to this issue.

This responsibility extends not only to doctors but also to pharmacists. Pharmacists serve as the primary point of contact for patients and are often the main source of self-medication, as medications can be purchased without a prescription. Unfortunately, there is a lack of adequate education provided by pharmacists regarding the potential dangers, side effects, and risks of medication use, including antibiotic resistance. It is crucial to shift focus onto pharmacists, as they frequently fail to fulfill their responsibilities, exhibit absence from their pharmacies, and provide inadequate consultation and awareness to patients. This is compounded by the presence of salespeople who lack proper knowledge of pharmacy principles and medication risks. Surprisingly, substantial percentages (41.5%) of individuals even purchase their medication from salespeople instead of qualified pharmacists. This issue highlights the shortcomings of the Algerian law in regulating salespeople within pharmacies.

While it is crucial to acknowledge that each individual bears responsibility for their own health, it is notable that a segment of the Algerian population tends to neglect self-education by disregarding the information provided within medication packages and making antibiotic changes without seeking professional medical advice. This behavior is often driven by a strong inclination to trust advertisements and place significant weight on the opinions of their social circles, including family and friends. These findings have been consistently supported by various studies conducted across different regions of Algeria concerning the prevalence of self-medication. [62] [15] [16]

2.9. The solutions to reduce the phenomenon of self-medication

We have observed through our survey that there is a problem of lack of awareness, as 65.3% are unaware of the risks of self-medication, and 56.4% do not know what antibiotic resistance is. Therefore, we propose enhancing awareness campaigns about the dangers of self-medication and the importance of consulting doctors.

These campaigns can be directed towards the general public, citizens in pharmacies, hospitals, universities, and workplaces, utilizing various media channels such as television, the internet, and social media. Algerian citizens should be educated about the true definition of self-medication and its risks. (see appendix 3)

Deterrent penalties should be imposed on pharmacists who sell medications without a prescription. Regular inspection programs should be organized to ensure compliance with laws and regulations related to medications and pharmacies.

These efforts should be comprehensive and involve solidarity between doctors and pharmacists, as well as organizing training workshops for healthcare sector workers. Doctors play a crucial role in guiding patients towards responsible self-medication by providing accurate diagnoses and medication recommendations. Pharmacists, on the other hand, offer valuable expertise on drugs and can advise patients on dosage and potential interactions. Training workshops bring healthcare professionals together to enhance their understanding of self-medication, promoting informed decisions. By strengthening collaboration and knowledge-sharing, we can ensure safe and effective self-medication practices.

The effectiveness of these measures can be accessed through monthly and annual statistics.

Also, through our survey, we have observed a significant increase in self-medication practices, with 90% of pharmacists confirming its prevalence. This self-medication trend is widespread and influenced by various factors. Among the participants, 44% cited a lack of time for medical consultation as a principal reason, while 39% attributed it to the high costs associated with medical examinations.

In light of these findings, we propose the establishment of an online platform to address this issue (see appendix 4).This platform would eliminate the need for waiting and traveling to receive medical advice. It would allow individuals to log in using their personal information and search for available doctors at any time. For example, if someone is experiencing dental pain late at night, they should not have to wait until morning for an examination. Instead, they

could purchase a pain reliever from a pharmacy. However, they may encounter salespersons instead of pharmacists who can provide advice, especially during nighttime hours. With this platform, they can log in and find available Algerian doctors dedicated to serving the Algerian people. The consultation could be offered at a nominal fee, which can be paid through the Algerian Gold Postal Card. We have recently noticed an increased interest among the Algerian population in using this card for online bill payments, indicating that it may not pose a barrier to the platform. The doctor would accept the examination, conduct a video call with the patient, and prescribe the medication. This way, we would eliminate the factors that drive the Algerian people towards self-medication.

Conclusion

This thesis has examined the prevalence and underlying factors of self-medication among the Algerian population. Through a study involving 202 Algerian individuals and 30 pharmacists from various provinces, the extensive use of self-medication, particularly with paracetamol, has been revealed. A key contributing factor identified is the lack of medical awareness among the population.

The study's findings emphasize the urgent need for interventions and measures to address the challenges associated with self-medication in Algeria. Specifically, there is a strong call for enhancing public education and awareness regarding the potential risks and benefits of self-medication. By implementing targeted educational campaigns that are tailored to reach vulnerable populations, individuals can be better equipped with knowledge about appropriate product selection, correct dosage administration, and the importance of seeking professional advice when necessary.

Regulatory enhancements also play a crucial role in regulating the availability of medications without a prescription. It is recommended that the list of medications allowed to be sold without a prescription be reviewed and updated to ensure the accessibility of safe and appropriate medications to the public. Additionally, strengthening the role of pharmacists in providing guidance and advice to patients is essential in promoting responsible self-medication practices.

Improving the healthcare infrastructure is paramount to reducing the need for self-medication due to financial constraints. Measures to increase access to affordable healthcare services and alleviate the financial burden on individuals will contribute to reducing the prevalence of self-medication.

The establishment of pharmacovigilance systems is of utmost importance to monitor and report adverse effects or side effects associated with self-medication. By promptly identifying emerging patterns or risks, timely interventions can be implemented to ensure the safety of individuals.

Further research on self-medication practices in Algeria is recommended to gain deeper insights into the factors influencing this behavior. This research can inform targeted interventions and policies to effectively address the challenges associated with self-medication.

In conclusion, the study highlights the widespread prevalence of self-medication among the Algerian population, primarily due to a lack of medical awareness. However, by implementing the recommended measures and interventions, including public education, regulatory enhancements, improvements in healthcare infrastructure, strengthening pharmacist roles, establishing pharmacovigilance systems, and conducting further research, Algeria can foster responsible self-medication practices and promote the well-being and safety of its citizens. It is essential for stakeholders, including government authorities, healthcare professionals, and community organizations, to collaborate in implementing these measures to bring about positive changes in self-medication practices and ensure the optimal healthcare outcomes for the Algerian population.

Recommendations:

Public Education and Awareness:

a. Launch public awareness campaigns: Develop educational initiatives to raise awareness about the risks and benefits of self-medication. These campaigns should focus on informing the public about appropriate product selection, correct dosage, potential side effects, and the importance of seeking professional advice when necessary.

b. Target vulnerable populations: Tailor educational campaigns to reach specific groups, such as the elderly, low-income individuals, and those with limited access to healthcare services, who may be more prone to self-medication practices.

Strengthen Healthcare Infrastructure:

a. Improve access to healthcare: Increase the number of healthcare facilities and professionals, particularly in rural and underserved areas. Enhance accessibility to qualified healthcare services, reducing the reliance on self-medication as the only means of healthcare.

b. Promote affordable healthcare: Implement policies to reduce the cost of prescription medications and enhance health insurance coverage, making professional medical advice more accessible and affordable for the population.

Enhance Pharmacist's Role:

a. Expand pharmacist responsibilities: Empower pharmacists to play a more active role in the healthcare system by providing comprehensive counseling to patients seeking OTC drugs, including information on potential drug interactions, contraindications, and adverse effects.

b. Continuing education for pharmacists: Encourage continuous professional development programs to ensure pharmacists are up-to-date with the latest medical knowledge, enabling them to provide accurate and reliable guidance to patients.

Establish Pharmacovigilance Systems:

a. Implement a national pharmacovigilance system: Create a robust system to monitor adverse drug reactions and side effects of OTC drugs. This system should facilitate reporting by healthcare professionals and the general public, leading to the timely identification and removal of potentially harmful medications from the market.

b. Collaboration with healthcare professionals: Foster collaboration between pharmacists, doctors, and other healthcare professionals to share information and promote efficient reporting and monitoring of adverse drug reactions.

Conduct Research and Surveillance:

a. Foster research on self-medication: Encourage research studies on self-medication practices in Algeria to better understand the factors influencing these behaviors, associated risks, and their impact on public health.

b. Monitor and analyze trends: Establish a surveillance system to monitor trends in self-medication, identify emerging health issues, and evaluate the effectiveness of interventions and policies.

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Annexes

Annexes 1 and 2:

Saad Dahlab University Blida

Faculty of Medicine Department of Pharmacy

SURVEY FORM FOR THE POPULATION

This questionnaire is conducted as part of a doctoral thesis in pharmacy. Its purpose is to assess patient self-medication practices in Algeria.

This questionnaire is anonymous.

Part one : General Information Section:

1. What is your Province?

   .....

2. What is your age?

   .....

3. What is your gender?
   - Male
   - Female
4. What is your marital status?
   - Unmarried
   - Married
5. What is your Highest Qualification?
   - The primary education level
   - The middle school level
   - The high school level
   - the college level
   - diploma
   - PhD
6. If you are a university student, what is your course?

- medical courses
- paramedical courses
- other courses

7. What is your profession?

.....

Part two: Self-Medication habits

1. Self-Medication habits with drugs

1. Do you use these medications for self-medication ?

- Paracetamol
  - Yes
  - No
- Corticosteroid
  - Yes
  - No
- Anti-inflammatory
  - Yes
  - No

2. Did you take any of the previous medications because you suffer from a chronic disease?
   - Yes
   - No
3. Do you check the prescribing information before self-medicating?
   - Yes
   - No
   - Sometimes
4. Do you understand the instructions of prescribing information?
   - Yes
   - No
5. Did you follow instructions for use?
   - Yes
   - No

6. What was your reason for self-medication?
    - High fees of doctor
    - I have old prescription
    - family or friend advice
    - Saves time
    - Other
7. From whom do you obtain your drugs for self-medication?
    - Pharmacist
    - Pharmacy salesperson
8. Have you been educated about the risks of self-medication?
    - Yes
    - No
9. If your answer is yes, from who?
    - The university (Medical courses ….)
    - awareness campaigns
    - gain knowledge through friends
    - by reading (scientific articles on the topic – internet…)
10. Have you ever experienced adverse events with self-medication?
    - Yes
    - No
11. If your answer is yes, what is it?
    - Hyperglycemia
    - Hypertension
    - Allergies
    - Bleeding
    - Other complications (digestive system disorders….)

2. Self-Medication habits with antibiotics

1. Have you ever self-medicated yourself with antibiotics?
    - Yes
    - No
2. Were you sure of the type of infection (bacterial infection)?
    - Yes
    - No

3. How did you know the dosage of antibiotics?
    - By checking the prescribing information
    - Internet
    - Consulting pharmacist or doctor
    - Consulting family or friend
    - Guessing the dosage by myself
    - Previous experience
4. Did you ever change the dosage of antibiotics during the course of self-medication?
    - Do not know
    - No
    - Yes
    - sometime
5. Why did you change the dosage of antibiotics during the course of self-medication?
    - To reduce adverse events
    - Health improved
    - Disease worsened
    - Other
6. When disease worsened did you change the antibiotics?
    - Yes
    - No
7. Have you been educated about antibiotic resistance?
    - Yes
    - No

2. Self-Medication habits with vitamin and mineral

1. Do you use these medications for self-medication ?

- Vitamin C
    - Yes
    - No
- Zinc
    - Yes
    - No
- vitamin d
    - Yes

- No

- magnesium
  - Yes
  - No

2. What was your reason for self-medication?
   - Advertisement
   - Used by peers – friends / family
   - High fees of doctor
   - Other
3. Have you ever experienced adverse events with self-medication?
   - Yes
   - No
4. If your answer is yes, what is it?
   - Headache or Dizziness
   - Palpitations
   - Hypertension
   - Other complications

Saad Dahlab University Blida

Faculty of Medicine Department of Pharmacy

SURVEY FORM FOR COMMUNITY PHARMACISTS

This questionnaire is conducted as part of a doctoral thesis in pharmacy. Its purpose is to assess patient self-medication practices in Algeria.

This questionnaire is anonymous.

1. Based on your experience as an Algerian pharmacist, does the rate of self-medication increase or decrease?
   - Increase

- Decrease

2. What is the frequency of self-medication among Algerian citizens?
    - Once a day
    - once a week
    - once a month
    - once a year
3. On average, how many medications do not require a prescription?
    - From 0 to 5
    - From 5 to 10
    - From 10 to 15
    - More than 15
4. What are the best-selling medications without a prescription?
    - Analgesics
    - Corticosteroid
    - Anti-inflammatory
    - Antibiotics
5. What are the best-selling vitamins and minerals without a prescription?
    - Vitamin C
    - Zinc
    - vitamin d
    - magnesium
6. What are the top-selling medications, Are they expensive or affordable?
    - Expensive
    - Affordable

Screenshot from the Online Survey

استبيان حول التداوي الذاتي :

Sign in to Google to save your progress. Learn more

* Indicates required question

البيانات الشخصية:

الولاية: *

Your answer

العمر: *

التداوي الذاتي

هذا الاستبيان موجه الى صيادلة الجزائر.

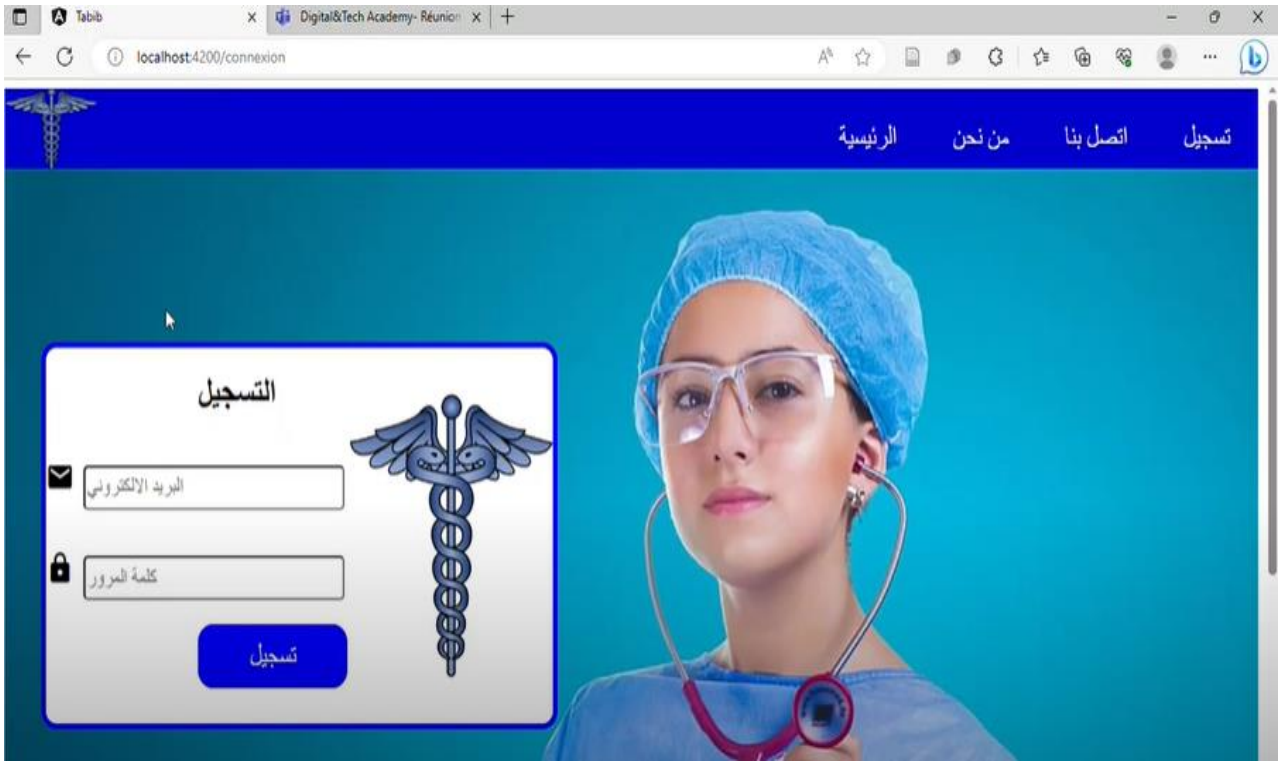
* من خلال تجربتك كصيدلي جزائري;هل نسبة التداوي الذاتي تتزايد ام تتناقص في الجزائر؟

- تتزايد
- تتناقص

* ماهو معدل تكرار اللجوء الى التداوي الذاتي من قبل كل مواطن جزائري ؟

- مرة في اليوم
- مرة في الاسبوع

Annexes 3 and 4: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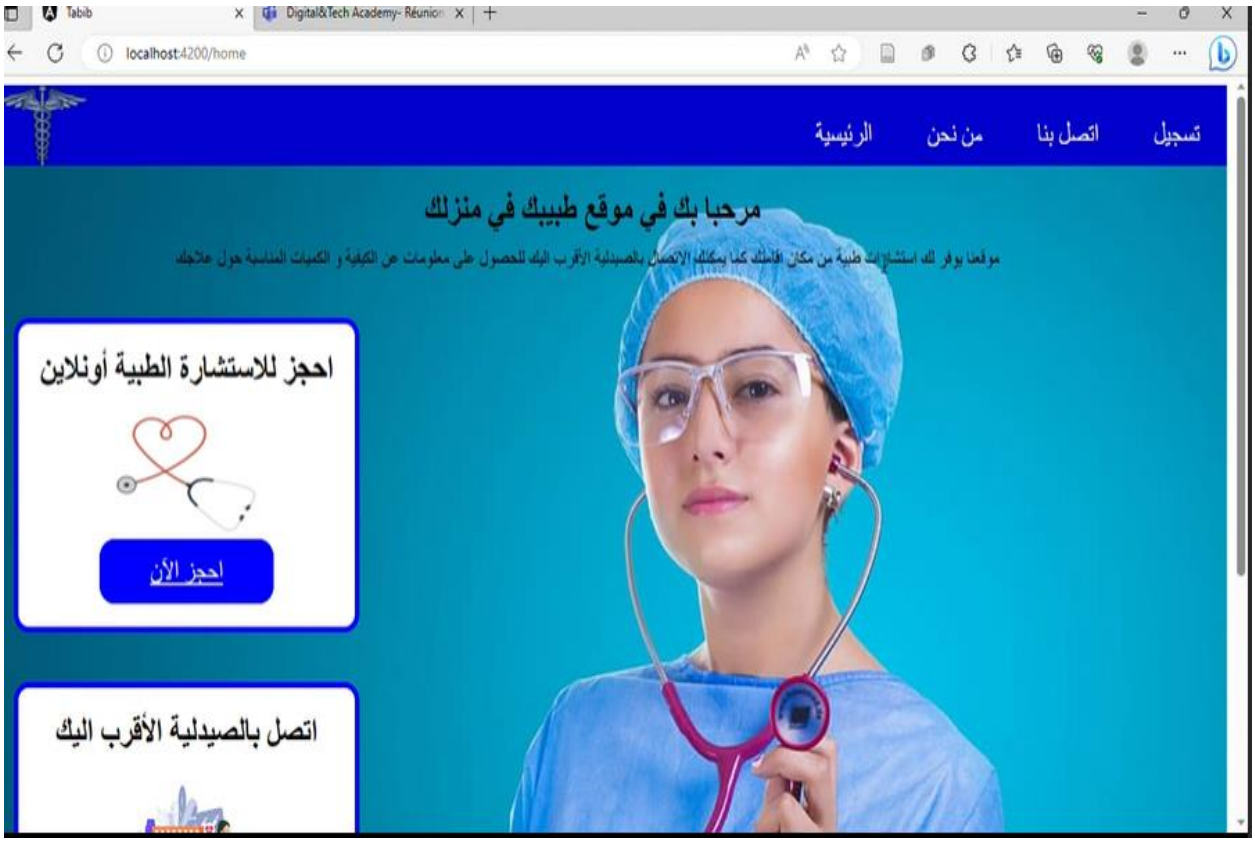
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اتصل الآن
الطبيب 2
اتصل الآن

Summary:

Self-medication is a widespread practice in Algeria, where individuals use medications without professional medical guidance. This study investigates the associated risks and adverse effects of self-medication in the Algerian context. A mixed-methods approach was employed, including a literature review and interviews/questionnaires with the Algerian population. The findings reveal that self-medication is common, with many relying on over-the-counter medications and traditional remedies without consulting healthcare professionals. Although it offers convenience and cost savings, self-medication carries significant risks such as misdiagnosis, inappropriate drug selection, and antibiotic resistance. Adverse effects include medication side effects and perpetuation of healthcare inequalities. Factors contributing to self-medication include limited healthcare access, financial constraints, and cultural beliefs. To address these issues, raising awareness, promoting responsible self-care, and improving health literacy are crucial. Regulatory measures should also be implemented, including stricter prescription enforcement and increased surveillance of the pharmaceutical market. This study emphasizes the need for comprehensive strategies to mitigate risks and improve health outcomes in Algeria.

الملخص:

التداوي الذاتي هو ممارسة شائعة في الجزائر، حيث يستخدم الأشخاص الأدوية بدون استشارة طبية. تهدف هذه الدراسة إلى فهم المخاطر والآثار السلبية لهذه الممارسة في السياق الجزائري. استخدمت الدراسة مجموعة من المنهجيات لجمع البيانات، بما في ذلك المراجعة النظامية للمراجع العلمية وإجراء مقابلات واستبيانات. أظهرت النتائج أن التداوي الذاتي ينتشر واسعًا في الجزائر، وينطوي على مخاطر تشمل التشخيص الخاطئ واختيار الدواء غير المناسب وتناول الجرعات الغير صحيحة وتفاعلات الدواء وتأخر العلاج للحالات الطبية الأساسية ومقاومة المضادات الحيوية. بالإضافة إلى ذلك، يشمل الآثار السلبية تفاقم الأعراض والآثار الجانبية للأدوية وتفاقم عدم المساواة في الرعاية الصحية. للتصدي لهذه المشكلة، يجب زيادة الوعي بالمخاطر المرتبطة بالتداوي الذاتي وتعزيز الرعاية الذاتية المسؤولة وتعزيز الوصول إلى الرعاية الصحية وتنفيذ تنظيمات تضمن استخدام الأدوية بطريقة آمنة ومناسبة. هذه الدراسة تسلط الضوء على الحاجة الملحة لاعتماد استراتيجيات شاملة لمواجهة التداوي الذاتي في الجزائر وحماية صحة السكان.

Resume :

L'automédication est une pratique répandue en Algérie, où les individus utilisent des médicaments sans avis médical. Cette étude examine les risques et les effets indésirables de cette pratique en Algérie. Les méthodes de collecte de données incluent une revue de la littérature scientifique et des entretiens et questionnaires avec des Algériens. Les résultats montrent une utilisation répandue de l'automédication en Algérie, avec des risques tels que le mauvais diagnostic, le choix inapproprié de médicaments, les doses incorrectes, les interactions médicamenteuses et la résistance aux antibiotiques. Les effets indésirables rapportés comprennent des effets physiques, psychologiques et sociaux, tels que les effets secondaires des médicaments et l'aggravation des symptômes. Plusieurs facteurs contribuent à cette pratique, notamment l'accès limité aux soins de santé, les contraintes financières, le manque de connaissances en matière de santé et les croyances culturelles. Pour réduire les risques, il est nécessaire de sensibiliser la population aux dangers de l'automédication, de promouvoir des soins responsables, d'encourager la consultation médicale et d'améliorer les connaissances en santé. Des mesures réglementaires sont également recommandées pour garantir une utilisation sûre des médicaments. Cette étude souligne l'importance de stratégies globales pour faire face aux risques et aux effets indésirables de l'automédication en Algérie.