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| RESEARCH ARTICLE

Alcohol-Medications Interactions in Older Adults: Comprehensive Analysis and Recommendations

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| ABSTRACT
This study analyses the hazardous effects of alcohol with common medications, especially in older adults. Older adults, especially those above 60 years, metabolize alcohol more slowly than the younger age groups. They are prone to non-communicable chronic diseases, such as hypertension, diabetes, and other chronic illnesses, and hence use more routine medications. These medications could have adverse effects with alcohol, leading to minor or serious harm and reducing the efficacy of the therapeutic regimen. Therefore, by deploying a narrative review of relevant articles from the literature, we describe alcohol medication interactions, particularly concerning the elderly. For all age groups, the study highlights acetaldehyde syndrome and the waiting period after alcohol intake and vice versa. We maintain that most routine medications in older age groups are not compatible with alcohol, and alcohol metabolism varies with age, gender, strength, and amount of alcohol consumed. We discovered that alcohol's average clearance span is between 12 and 25 hours. Thus, we recommend at least a waiting period of 12 hours before taking alcohol after medication and vice versa. A study of this caliber re-emphasizes the need for a heightened understanding of alcohol medication interactions by doctors, nurses, and pharmacists. It would facilitate effective pharmacological treatment and mitigate the deleterious consequences of alcohol medication interactions on all age groups, including the elderly.

| KEYWORDS

Alcohol, Alcohol-Medication Interactions, Medications, NCCDs, Acetaldehyde, Ethanol.

| ARTICLE INFORMATION

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1. Introduction

Globally, many individuals use alcohol as a recreational drink. Alcoholic drinks and alcoholic beverages are composed of ethanol, a psychoactive and toxic substance, which has the capacity for dependence and mild or severe medication interactions (WHO Factsheet on Alcohol, 2024). By 2030, the WHO estimates that one out of six people globally will be 60 years or over, with a projected rise in the elderly's population from 1 billion in 2020 to 1.4 billion. By estimates, the number of individuals aged 60 years and above would have doubled to 2.1 billion by 2050 (WHO Ageing and Health, 2024). It could pose a global health burden in the future. In the contemporary era, many older adults worldwide are suffering from one or more chronic ailments, and they need medications to alleviate these maladies.

Many prescribed pills and over-the-counter medications (OTC) pose risks to human health due to their interactions with alcohol (AMI, 2025; Breslow et al., 2015). One study found that about 40 percent of the elderly who regularly use alcohol took medications that have the propensity to cause reactions in the US (Breslow et al., 2015). For context, many older adults are prone to having adverse reactions to alcohol due to their idiosyncrasies. They have a slower capacity to metabolize alcohol; hence, it stays longer in their system, making them prone to alcohol-medications interactions (AMIs) (WHO Factsheet on Alcohol, 2024).

Moreover, the prevalence of non-communicable chronic diseases (NCCDs) such as hypertension, diabetes, cancers, hypercholesterolemia, osteoarthritis, and others is higher in older adults (WHO Ageing and Health, 2024). Hence, they take more medications, which can have serious consequences resulting from AMIs (Moore et al., 2007; Cousins et al.,2007). Many are also prone to sleep rhythm disturbance, which often necessitates the prescription of sleep medicines. These can have disastrous consequences for those who frequently use alcohol. For instance, in the United States, about 5-6 percent of older adults who consume alcohol regularly are prescribed opioids or benzodiazepines for at least a month; these could have catastrophic consequences (Borodovsky et al., 2019). Unfortunately, the number of older adults taking alcohol with prescribed medications is increasing worldwide (Holton et al., 2017).

In Seychelles, the archipelago state, NCCDs portends a significant health threat for the older age group. In 2023, out of 879 deaths, a total number of 460 were ascribed to chronic diseases such as cardiovascular disease, cancer, diabetes, and chronic respiratory conditions (SAHPR, 2023). Seychelles has one of the highest alcohol per capita rates globally and the second in sub-Saharan Africa. In 2020, WHO estimated 10.19 liters of alcohol per capita adjusted for tourists (Our World in Data, 2025). As of 2024, the estimated alcohol intake for an individual in a year was 12 liters (GUACC, 2025). In 2023, Seychelles recorded the highest frequency of alcohol consumption (46.5%) in school- going adolescents among eight sub-Saharan countries (Seychelles Nation, 2023). Hence, these trends pose a threat to both the young and the older adults regarding prescribed and OTC medications in Seychelles. As of 2024, Uganda consumed the highest alcohol per person in Africa, 12.2 liters (GUACC, 2025). In Uganda, a previous study highlighted 26.85% as the total prevalence of alcohol intake, with approximately one-tenth of the population suffering from alcohol use disorder (Kabwama et al., 2016). The researchers further found out older adults were more likely to be medium- to high-end alcohol users than younger participants, and most of them were on prescribed medications (Kabwama et al., 2016).

In Europe, in 2024, Romania consumed the highest amount of alcohol, 17 liters, followed by Georgia with 14.3 liters (GUACC, 2025). Both countries, among other European countries, have a high prevalence of NCCDs, and considerable proportions of older adults who use routine medications and consume regular alcohol. In the Europe region, NCCDs are the leading causes of deaths, and Eastern Europe has a disproportionately high rate of cardiovascular disease, usually due to behavioral factors including high alcohol consumption and smoking (WHO NCDs, 2022**)**. In this regard, the reduced efficacy of routine medications resulting from alcohol interactions poses a serious threat to the efficacious management of chronic diseases.

Contrastingly, some economies have extremely low alcohol per capita (0.01-0.1 per liter) such as Niger, Indonesia, Pakistan, Somalia, Sudan, Bangladesh, Saudi-Arabia, and other countries where Islam is the state religion (GUACC, 2025). They forbid the consumption and sale of alcohol except to tourists in restricted quantities. In these climes, there is still a plausibility of AMIs, because some OTC and prescribed medications contain considerable proportions of alcohol. Some cough medicines, laxatives, iron supplements, and mouthwashes, among other OTC medications have significant proportions of ethanol. For instance, Benylin cough syrup has 3 percent alcohol, Phenergan cough expectorant consists of 7 percent alcohol, Feosol Elixir (5 %), Chlorhexidine mouth wash (11.6 %), Listerine mouth wash (26%), and Lomotil liquid (15 %) (Alcohol content in common preparations, 2022)

Concerning studies of alcohol, there is no dearth of recent scholarship on the deleterious impacts of alcohol on general well-being (Schröder et al., 2025; Haber, 2025; Krist & Bradley, 2025). By deploying standard drink sizes (12 oz of beer [5% alcohol by volume], 5 oz of wine [12% alcohol by volume], and 1.5 oz of liquor [40% alcohol by volume]), they categorized alcohol disorders into risky drinking and alcohol use disorders (Centers for Disease Control and Prevention, 2025). Concerning risky drinking, it involves the consumption of heavy drinking, more than 7 drinks in a week for women and more than 14 drinks for men. Binge drinking is characterized by more than 3 drinks daily

for women and more than 4 drinks for men (Centers for Disease Control and Prevention, 2025). Regarding alcohol use disorder, it is described as a lethal pattern of alcohol intake that seriously impairs well-being and functioning. Alcohol use disorder is diagnosed by the presence of any two or more symptoms, out of 11 stipulated criteria, 12 months prior, as described in the *Diagnostic and Statistical Manual of Mental Disorders*, fifth edition, DSM-5(DSM-5-TR, 2022).

Focusing on the theme of this study, in recent times, some studies have attempted to highlight AMIs. However, they have approached the analysis of AMIs from the national or regional level (AMI, 2025; Breslow et al., 2015; Cousins et al. 2007; Traccis et al., 2022). They highlighted the prevalence of AMIs by focusing on particular climates and their contextual peculiarities. In other studies, scholars have studied the dynamics of AMIs in older adult (Moore et al., 2007; Cousins et al.2007; Holton et al.2017). There is a need for a more detailed emphasis on older adults, and a holistic approach to AMIs, considering its global significance. Hence, we intend to shed more light on AMIs. Broadly, we set out to highlight acetaldehyde syndrome and illuminate the concept of a waiting period before taking medications after alcohol intake and vice versa. Hence, this review intends to approach the subject of AMIs holistically.

2. Methodology

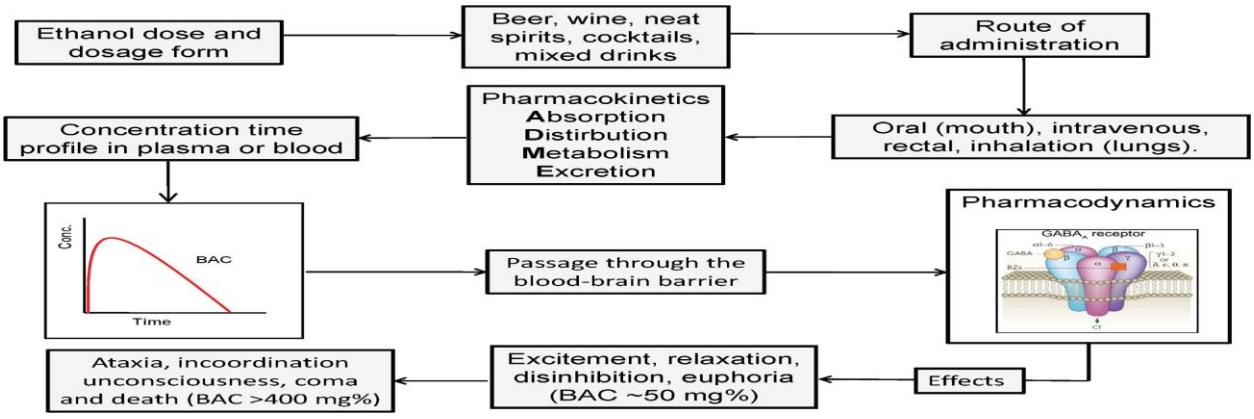
We deploy a descriptive analysis of common AMIs along three paradigms. They are common alcohol drug interactions, acetaldehyde syndrome, and waiting period before administration of medications after alcohol consumption and vice versa. We derived our data from relevant studies regarding AMIs from Google Scholar, Embase, Scopus, and Web of Science. To enhance our search from the databases, we set up a research question, '' What is the health significance of alcohol- medications interactions ''. We then engage keywords such as '' alcohol'', ''alcohol metabolism'', '' alcohol side effects, ''alcohol interactions, ''and ''alcohol- medications interactions''. We narrowed our search to recent and relevant articles from 2010 to 2025 and used the snowballing method to derive other articles from the existing data. Subsequently, we deploy a narrative review of sourced data to describe common AMIs, acetaldehyde syndrome, and common waiting period before medication administration after alcohol intake and vice versa. Research focusing extensively on alcohol user disease and its management was excluded from this review article. We provide an overview of AMIs by concentrating on updating the reader on recent advances and controversies. Information from sources other than peer-reviewed journals has been evaluated but was not considered to add indispensable new information, so is not covered in this review article.

3. Findings and Discussion

3.1 Common Alcohol-Medications Interactions

There are two forms of AMIs. We look at this from pharmacokinetics and pharmacodynamics perspectives. The former involves how the body acts on a given medication. It consists of absorption, distribution, metabolism, and excretion. Alcohol can alter the absorption and metabolism of some medications, which can alter their concentration and cause deleterious side effects. They can slow or quicken the clearance rate of medications, thereby increasing or decreasing their concentration to trigger severe AMIs (Johnson& Seneviratne,2014). Regarding pharmacodynamics, alcohol can influence the pharmacological impacts of medication via their target sites, with concomitant decrease or increase in concentration of medication, which can have harmful impacts on patients (Johnson& Seneviratne,2014; Noureldin et al.2010).

Figure 1: pharmacokinetics and pharmacodynamics of alcohol



Adapted from Alain W. Jones, Alcohol, its absorption, distribution, metabolism, and excretion in the body and pharmacokinetic calculations. WIREs Forensic Sci. 2019; e1340. https://doi.org/10.1002/wfs2.1340

After comprehending the physiological basis of AMIs, Table (1) will show common medications that older adults above 60 years are more likely to use for chronic ailments. As already highlighted, the elderly are more likely to use cardiovascular medications, anticoagulants, opioids, benzodiazepines, analgesics, and others due to their peculiarities. The corresponding harmful effects when taken with alcohol, either in moderate or heavy amounts, are also highlighted in Table (1). However, these effects are more accentuated after risky drinking with alcohol consumption.

Table 1 Common Alcohol – Medications Interactions

Medication	Sequelae of Interactions	Mechanism of Interactions by Alcohol	Sources
Opioid Morphine Fentanyl Meperidine Pentazocine Codeine Methadone	Weakness, Reduced motor coordination Impaired / Reduced respiration Fainting / Dizziness	Potentiates the action of mu – opiods receptors in the brainstem	Ramirez et al.,2021
Benzodiazepines Diazepam Nitrazepam Clonazepam Lorazepam Midazolam Oxazepam Temazepam	Weakness, Dizziness, Respiratory, Motor impairments, Respiratory suppression, Collapse	Potentiates the effect GABA receptors	Kang et al., 2022
Antidepressants - SSRI. Sertraline Fluoxetine Paroxetine Fluvoxamine MAOI inhibitors Phenelzine Selegiline Isocarboxazid tranylcypromine	Heightened Drowsiness and Dizziness Reduced patients' adherence and response. Increased risk of overdose. Hypertensive crises might result with MAOI	Alcohol releases serotonin and norepinephrine from central nerve endings	Satre et al., 2014; Antidepressants and Alcohol Interactions, 2024.
Non-steroidal anti-inflammatory drugs Ibuprofen, Naproxen, Diclofenac, Aspirin Ketoprofen Flurbiprofen	Gastritis, Gastrointestinal bleeding, Liver damage	Erosion of gastric mucosa. Alcohol impairs the prostaglandin 's protective function in the gastric mucosa.	Strate et al., 2016
Acetaminophen Paracetamol Tylenol	Liver Damage	Alcohol and acetaminophen share Cytochrome P450 metabolism. Combination leads to increased production of NAPQI, which damage the liver.	Rumack et al., 2012
Anticoagulants Warfarin Coumarin	Increased risk of bleeding	Decreases metabolism of warfarin leading to heightened pharmacological action	Roth et al.,2015

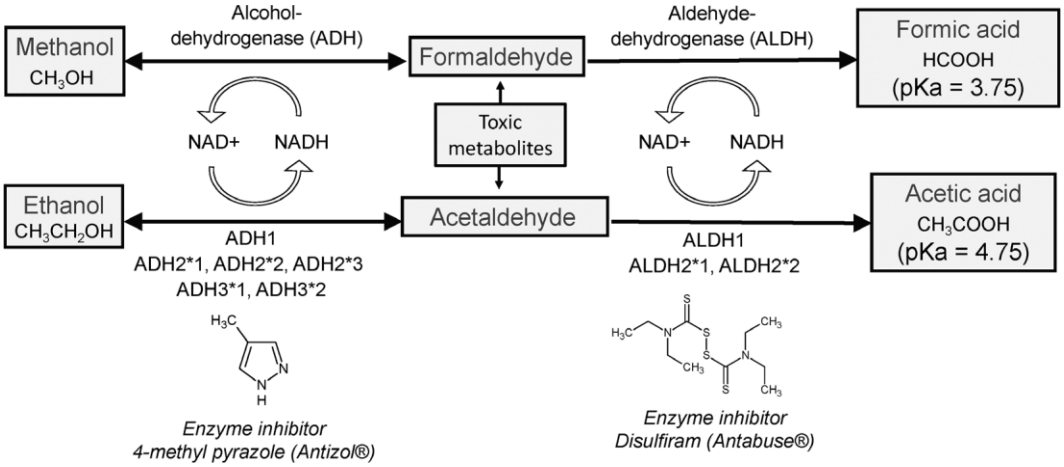
Cardiovascular medications (1) verapamil	Increase Blood Alcohol Concentration (BAC) leading to dizziness, weakness, reduced motor function, and collapse	Inhibits alcohol metabolism causing intoxication	AMI, 2025
Cardiovascular medications (2) Propranolol Atenolol Metoprolol Labetalol Sotalol	Dizziness, lightheadedness, fainting, low heart rate	Alcohol inhibits its metabolism, heightening its effects	AMI, 2025
Statins Atorvastatin Simvastatin Pravastatin Rosuvastatin Fluvastatin Lovastatin	Bloating, Diarrhea, Constipation, Headache, Dizziness Increased Triglycerides, Myositis, Liver damage	Competition with Alcohol with NADH responsible for their metabolism hence increased concentration of statins in the system.	AMI, 2025
Antibiotics Erythromycin Doxycycline	Reduced pharmacological effect	Alcohol induces their metabolism	Mergenhagen et al.,2020
Antifungals Griseofulvin Ketoconazole	Reduced pharmacological actions	Alcohol induces their metabolism	Mergenhagen et al.,2020
Anti-Tuberculosis Medications Isoniazid Rifampicin Pyrazinamide Ethionamide	Increased risk of liver toxicity and damage	They share metabolic enzymes with alcohol leading to production of toxic metabolites which can damage the liver.	Mergenhagen et al.,2020
Tricyclic Antidepressants Amitriptyline Clomipramine Desipramine Doxepin Imipramine Nortriptyline	Increases the risk of sedation and drop in blood pressure	Release of serotonin and norepinephrine	AMI, 2025
Histamine H2 receptor antagonist Cimetidine Ranitidine Famotidine Nizatidine	Increases the risk of alcohol disorders and intoxication	Inhibits ADH in the stomach thereby increasing gastric emptying and BAC	AMI,2025

MAOI – Monoamine Oxidase Inhibitors, SSRI – Serotonin Selective Reuptake Inhibitors
BAC – Blood Alcohol Concentration, GABA – G - Aminobutyric Acid Inhibitors
ADH – Alcohol dehydrogenase, NADH – Nicotinamide adenine dinucleotide
NAPQI – N- acetyl-p-benzoquinone imine

3.2 Acetaldehyde Syndrome

Alcohol is rapidly degraded into a toxic metabolite, acetaldehyde, by alcohol dehydrogenase. Acetaldehyde is responsible for the initial deleterious effects of alcohol consumption such as headache, flushing, nausea, and vomiting (Borja-Oliveira,2014). Acetaldehyde is rapidly metabolized to acetate by aldehyde dehydrogenase. This ameliorates its effects when low to moderate doses of alcohol are consumed. Disulfiram, also known as Antabuse, works on this pharmacokinetic principle. This medication inhibits aldehyde dehydrogenase, hence resulting in the accumulation of acetaldehyde, leading to Antabuse effects such as facial redness, nausea, feeling sick, fast heartbeat, and low blood pressure (Borja-Oliveira,2014).

Figure 2: Depicting Metabolism of Ethanol and Methanol



Adapted from Alain W. Jones, Alcohol, its absorption, distribution, metabolism, and excretion in the body and pharmacokinetic calculations. WIREs Forensic Sci. 2019;e1340. https://doi.org/10.1002/wfs2.1340

Some medications are inhibitors of alcohol dehydrogenase and have the capacity to cause accumulation of acetaldehyde, like disulfiram, thereby causing acetaldehyde syndrome. Table (2) displays common medications that could trigger acetaldehyde syndrome, their effects, and general treatment modalities.

Table 2: Common medication that can cause Acetaldehyde syndrome, Sequalae and Treatment

Medications	General Manifestation	General treatment	Source
Antibiotics such as Cephalosporins e.g. cephalexin, cefuroxime, cefamandole, cefixime, Nitroimidazoles such as metronidazole, tinidazole, ornidazole Chloramphenicol	Flushing, sweating, vomiting, hypotension, fast heartbeat, bronchospasm Some may manifest with intolerance to alcohol and reduced compliance to medications.	Mild cases – discontinuation of medication, reassurance, and health education. Severe cases – Oxygen inhalation, I.V Fluid Resuscitation, Oral or parenteral diazepam to alleviate anxiety. Dopamine infusion Adrenaline treatment (if warranted)	Borja-Oliveira,2014
Dermatological Preparations containing tacrolimus, pimecrolimus. Sulfiram cream (used for scabies)			
Antivirals such Abacavir and antiviral liquid preparations such as lopinavir/ritonavir			
Other Medications Chlorpropamide Nilutamide			

3.3 Waiting Period before taking Medications after Alcohol Intake

There is no rule of thumb or absolute period that fits all medications regarding the waiting period for alcohol intake, before or after drinking alcohol. This is because the rate of metabolism varies for individuals and depends on certain factors (Cleveland Clinic Health Essentials, 2021). Age, gender, race, and strength, as well as the quantity of alcohol taken, can shape an individual's metabolism. Older adults metabolize alcohol more slowly because of reduced action of ADH. Therefore, it takes a longer period before total alcohol clearance from the system. Women are known to have lower concentrations of ADH; hence, they have reduced first-pass metabolism, predisposing to higher Blood Alcohol Concentration (BAC). Women have higher fat concentration, and since alcohol is water soluble, they reach higher BAC quicker than men and thus are more prone to faster alcohol adverse effects (Cherney, 2022). An appreciable percentage of South Asians, Japanese, and Koreans lack the ADH necessary for the initial metabolism of alcohol resulting in the accumulation of acetaldehyde (Matsumura et al., 2019; Lee, 2019). Therefore, they are prone to having ''Asian flush'', characterized by facial flushing, nausea, and vomiting, creating a form of alcohol intolerance. The strength of the alcohol consumed and the frequency also determine the waiting period (Cleveland Clinic Health Essentials, 2021). It is more in a heavy drinker than in an occasional alcohol user. It is more injurious in a binge drinker.

However, when an individual starts to drink, peak concentration in the body is achieved after 60 to 90 minutes, then degradation of alcohol starts in the body. The average half life of alcohol is 4-5 hours, and full clearance of alcohol takes 5 half lifes (Cleveland Clinic Health Essentials, 2021; Cherney, 2022). Therefore, it takes roughly 25 hours before the complete clearance of alcohol from the system. The average half-life of this comes to 12.5 hours. In this regard, the appreciable clearance of alcohol spans from a 12-hour half-life to the average complete clearance time of 25 hours. Therefore, we recommend a waiting period of at least 12 hours for most medications without a particular AMI. It also goes for the consumption of regular pills, after alcohol intake. Nevertheless, this waiting period does not apply to parenteral medications such as intravenous and intramuscular injections, which bypass liver metabolism, leading to more potent and therapeutic effects.

However, the waiting times for oral medications depend on various factors. Alcohol has been known to remain in the system between six and 72 hours, depending on the strength and amount consumed, and the type of medications.

Certain medications, such as Ibuprofen, diclofenac, and other NSAIDS, are peculiar. In this instance, the patient should wait for at least 24 hours after their therapy before taking alcohol to reduce the risk of gastrointestinal side effects. Medications that could potentiate acetaldehyde syndrome, such as nitroimidazoles like tinidazole, should not be taken for at least 3 days after the intake of alcohol. Patients taking antimicrobials such as cephalosporins should also wait for 72 hours after completion of therapy before consumption of alcohol (Borja-Oliveira,2014). It is generally advisable to encourage patients not to indulge in drinking while taking medications. This is due to the inherent characteristics of alcohol being a cytochrome P 450 enzyme (CYP450) inducer for most antimicrobials, thus reducing their concentrations in the blood stream and at the target receptors.

4. Conclusion and Recommendations

Alcohol is a significant risk factor for the global burden of fatalities and disability-adjusted life years, with the older age group more prone to harm and injuries resulting from alcohol consumption (GBD 2016 Risk Factors Collaborators, 2017). Even at a considerably low level of alcohol use, their physiological and anatomical changes occasioned by aging make them susceptible to harm from AMIs (Holton et al., 2020). Moreover, they are vulnerable to NCCDs, which necessitate the use of many medications. Hence, they are more prone to severe consequences of AMIs such as hypoglycemia, heightened sedation, increased danger of gastrointestinal hemorrhage, and orthostatic hypotension (Moore et al., 2007). Against this backdrop, this review article highlighted regular interactions of alcohol with common medications used in older age groups. We also analysed acetaldehyde syndrome and the average waiting time before the consumption of alcohol after common pills.

Generally, we recommend that older adults refrain from alcohol when taking their regular routine medications, if possible. Many routine medications they take do not mix with alcohol; hence, they should abstain for optimal therapeutic benefits. In case they need to consume alcohol, we recommend taking alcohol in moderation. For instance, a standard unit of alcohol per day is adequate. One standard drink contains 14g of ethanol. This is found in 12 ounces of regular beer with 5% ethanol (about one can of beer),0.5 ounces of wine with 12% ethanol (about one glass of wine), and 1.5 ounces of distilled spirits (80 proof) with 40% ethanol (about one shot) (Cleveland Clinic Health Essentials, 2021). Many older adults are taking routine medications for NCCDs such as hypertension, diabetes, hypercholesterolemia, osteoarthritis, and others. Therefore, compliance with alcohol intake is pivotal for their adequate management. In this light, we advise strict compliance to the 12-hour regimen of waiting period before taking alcohol after medication and vice versa. This would prevent unnecessary AMIs regarding their routine medications to ensure optimal management.

Diabetes patients should take precautions before taking alcohol, as it can potentiate dangerous hypoglycemia or hyperglycemia depending on the nutritional status of the patients. Diabetic patients who are well-nourished with enhanced glucose stores are vulnerable to hyperglycemia. In a fasted diabetic patient with depleted glucose stores, alcohol can trigger intense hypoglycemia by blocking gluconeogenesis pathways (Weathermon & Crabb, 1999). Alcohol effects could mask hypoglycemic symptoms, which have catastrophic consequences. In this regard, diabetic patients are advised to keep track of their blood sugar before alcohol consumption because hypoglycemia can mask alcohol effects and vice versa. Moreover, patients using certain anti-diabetics such as chlorpropamide are advised about the risk of facial redness, feeling sick, vomiting, and low blood pressure when they are taken with alcohol. For hypertensive patients using some cardiovascular tablets such as isosorbide, terazosin, and doxazosin, they should be educated that alcohol intake with those pills may cause serious hypotension (Weathermon & Crabb, 1999).

Generally, patients on antibiotics such as cephalosporins, nitroimidazoles, and chloramphenicol should be educated about the potential risk of acetaldehyde syndrome, especially if they consume alcohol along with the medications. Adequate education should be given about waiting periods by doctors and pharmacists alike. For instance, when using metronidazole, patients should desist from consumption of alcohol during treatment and until 24 hours after completion. For tinidazole, they should refrain from alcohol intake during treatment and for 72 hours after treatment. For furazolidone and secnidazole, alcohol consumption should be avoided during, and for 96 hours after completion of treatment (Borja-Oliveira,2014).

Finally, for the general populace, most medications do not mix well with alcohol. Given the high rate of alcohol intake in the post-modern world, all hands must be on deck to redress the trends of AMIs. Health professionals such as

doctors, nurses, and pharmacists have huge roles in mitigating adverse AMIs. At the time of consultations and prescriptions, they should furnish patients with adequate information about therapy and their likely interactions with alcohol. They should properly educate patients about the need to withhold alcohol intake before and after medications for efficient therapy and prevention of harm from AMIs. On the flip side, patients should always check and read leaflets of medications regarding precautions about alcohol intake with medications to forestall mild and serious consequences of AMI. When patients are not sure of the AMIs of any medications, they should always endeavor to ask health professionals for necessary guidance.

4.1 Limitation of the Study

This review article did not analyze all the chronic medications used in older people for NCCDs. We highlighted the samples. Hence, it is non-exhaustive. Moreover, this work did not focus on general sequalae of risky alcohol intake such as personality changes, poor work performance, falls, increased risk of accidents, and other harmful effects of alcohol addiction and alcoholism. Alcohol use disorder and medications to treat alcoholism, such as naltrexone, acamprosate, gabapentin, topiramate, and disulfiram, are not the central theme of this study. Although the emphasis is on the older age groups, other general alcohol issues, such as the average waiting time before alcohol intake after medications and acetaldehyde syndrome were discussed in this study. Lastly, the recommendations of waiting time do not apply to parenteral drug administration, where doctors should evaluate specific contexts of patients to determine the best course of action, regardless of alcohol consumption. Our study sets a foundation for other studies regarding AMIs in the future. Research highlighting AMIs in specific groups such as immunocompromised on antivirals or chronic alcoholics on Antabuse medications would be a valuable addition to the knowledge base of AMIs.

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