



Original Research Article

A cross-sectional study on behavioral health, usage of prescription patterns, and cost analysis of antidepressant medications in alcohol dependence syndrome at a tertiary care hospital in Bangalore, Karnataka, India

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Abstract

Background: People with Alcohol Dependence Syndrome (ADS) have difficulty stopping alcohol use. Stress is a common reason for drinking, which can lead to physical, emotional, and relationship problems. Alcohol also affects brain function and sexual health. Having a family history of alcohol use increases the risk. Treatment involves counseling, support, and medicines, although some medicines may also cause dependence.

Materials and Methods: A cross-sectional study was carried out over a period of six months. This study was conducted on 210 inpatients at the psychiatric department of a tertiary care hospital in Bangalore. Data were collected using a customised form, capturing patient demographics, clinical details, and prescription information. They looked at health habits, medicine use, and the cost of antidepressants in people who had alcohol problems. Drug interactions were analysed using Lexicomp software, and Microsoft excel was utilized for statistical analysis. Patients aged 15 and above with full details were included; others were not.

Result: This study looked at 210 patients. Most were men (206 or 98.09%) and unmarried (176 or 83.8%). The largest age group was 38–47 years (46.66%), followed by 28–37 years (32.85%). The main risk factors were tobacco use (87 patients or 50%) and smoking (67 or 38.5%). Many patients had a medical history (138 or 65.71%) and family history (139 or 66.19%) of illness, mainly diabetes (26%) and high blood pressure (24%). Alcohol use was highest among people drinking for 6–10 years (28.8%) and 16–20 years (20.47%). Most patients had a Mental State Examination (75.84%) and some had Eye-to-Eye Contact Therapy (24.15%). The most common alcohol dependence was Type 1 and mild (44.28%). On admission, the most used medicines were Diazepam tablets (23.79%) and Lorazepam tablets (23.1%). During treatment, vitamins (13.31%) and Baclofen (13.58%) were most used. Each prescription had about 8.72 medicines, and 92.38% of patients got both tablets and injections. On average, each prescription had 2.2 antibiotics. Out of 1832 medicines, 1330 (72.59%) were brand-name and 502 (27.4%) were generic. Vitamins and iron were in 90.47% of prescriptions. There were 160 drug interactions, mostly moderate, with Lorazepam and Risperidone being the most common (17.5%). At discharge, Baclofen 20 mg (13.58%) and Methylcobalamin 2000 mg (11.41%) were most used. The cost of treatment showed a clear difference between brand and generic drugs. The most used group was benzodiazepines (492 medicines), and anti-depression medicines (sertraline, amitriptyline, clonazepam, etc.) had a big cost difference.

Conclusion: This study shows many ADS patients have depression. Doctors mostly use affordable antidepressants. Better mental health care is needed.

Keywords: Behavioral Health, Prescribing Pattern, Alcohol Dependence Syndrome, Benzodiazepine, Antidepressant.

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1. Introduction

Alcohol Dependence Syndrome (ADS) is the medical term for serious drinking problems. It means drinking too much for 1 to 12 months. Many people drink to handle stress, but this can cause social, emotional, and health problems, including sexual issues.¹

Alcohol problems are divided by type, subtype, and severity. Type 1 affects both men and women. Type 2 affects sons of alcoholic fathers. People may drink socially, in large amounts (binge), or daily (functional or chronic). Severity levels are mild, moderate, or severe, needing different levels of treatment or care.^{2,3}

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Alcohol dependence can be grouped by age and gender. Early onset starts at a young age and is high-risk, while late onset begins later and is lower-risk. Men are more likely to drink more and face heart and health problems.³

Alcohol dependence has many risk factors. Family history and starting to drink at a young age increase the risk. Signs include drinking often, needing more alcohol, and failing to stop. People may feel sick without alcohol and face problems at work or home.⁴

Marriage can affect alcohol use. Getting married often lowers the risk of alcohol problems, especially if the spouse does not drink too much. But marrying someone with alcohol issues increases the risk. Alcohol can also cause sexual problems, which may hurt relationships and lead to stress and less closeness.⁵

Some risk factors for alcohol dependence include having a parent or relative with alcohol problems, mental illnesses like depression or anxiety, and childhood trauma. Starting to drink before age 15, drinking too much in a short time, and high stress levels can also increase the risk of alcohol problems.⁶

Behavioral therapy is an important way to treat alcohol problems. It helps people learn about addiction, build healthy habits, improve relationships, and stay motivated to change. Signs of alcohol issues include drinking too much, hiding it, losing control, memory loss, feeling sick without alcohol, and taking dangerous risks while drinking.^{7,8}

Some medicines are used to help people with alcohol dependence. These include Acamprosate, Nalmefene, Disulfiram, Naltrexone, Baclofen, Topiramate, Varenicline, Gabapentin, Psilocybin, and MDMA. These medicines can reduce cravings, help with withdrawal symptoms, and support recovery. They are usually given along with counseling and other treatments.^{9,10}

Benzodiazepines (BZ) and similar drugs are used to treat many health problems like anxiety, seizures, and alcohol withdrawal. They can help with sleep and muscle relaxation. But they have risks like addiction, memory problems, and accidents. Long-term use can be harmful, so doctors must be careful when using them.¹¹⁻¹³

Antidepressants are medicines used to treat depression symptoms, but they may not fix the root cause. They help balance brain chemicals like serotonin and norepinephrine. People with alcohol dependence often also have depression, which can make treatment harder and increase health risks if not properly managed during recovery.¹⁴⁻¹⁷

2. Materials and Methods

2.1. Study design and Objectives

This study looked at patient records like case sheets, medicine details, counseling notes, and interviews. It aimed

to understand behavior, how medicines are given, and the risks of wrong prescriptions. The study also checked how often harmful drug combinations were used and looked at the cost of antidepressant medicines in people with alcohol dependence.

2.2. Study setting

The study was conducted at Sathagiri institute of medical sciences and research center a tertiary care hospital, in Bangalore. Data was collected from the inpatient psychiatric and general medicine, including patient profiles and prescriptions, and recorded in a self-designed data collection form. The study focused on behavioural health and usage of prescribing patterns and cost analysis of antidepressants medication. Ethical approval was obtained, and confidentiality was strictly maintained.

2.3. Selection of study participants

Inclusion criteria were patients admitted to the psychiatric and general medicine department. The patient was admitted to the general medicine and psychiatric department. The patient who has a complete social history. Patient aged 15 years and above. Patients who provide informed consent to participate in the study. Exclusion criteria were Patients who have participated in a similar study within the last year to avoid potential bias from repeated participation. Patients with incomplete social records, missing key information, or illegible, making it difficult to assess prescribing patterns accurately. Patients who decline to participate or do not provide informed consent for the study. In this study, only patients with Alcohol Dependence Syndrome (ADS) were included. Patients with or without other diseases (comorbidities) were both considered as part of the inclusion criteria.

2.4. Data analysis

Data from the last six months from all patients were reviewed and entered into Microsoft Excel. The collected data were compiled and analyzed to determine frequencies and percentages at both aggregate and facility levels. Interviews and observational data were also recorded and processing using Excel.

2.5. Ethical consideration

The study involved nonpublic patient data and required ethical clearance. Interviews with healthcare providers and observations of patient were conducted only after obtaining written informed consent from all participants. Patients' confidentiality and data protection were strictly maintained throughout the study.

3. Result

3.1. Patient age distribution

Out of 210 patients, most were aged 38–47 years (98 patients, 46.7%). Next were 28–37 years (69 patients, 32.9%), 48–57

years (34 patients, 16.2%), 18–27 years (4 patients, 1.9%), 58–67 years (3 patients, 1.4%), and 68+ years (2 patients, 1%). Most patients were middle-aged which observed in **Figure 1**.

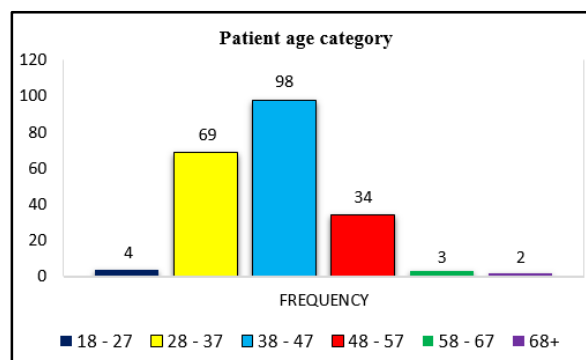


Figure 1: Patient age distributon

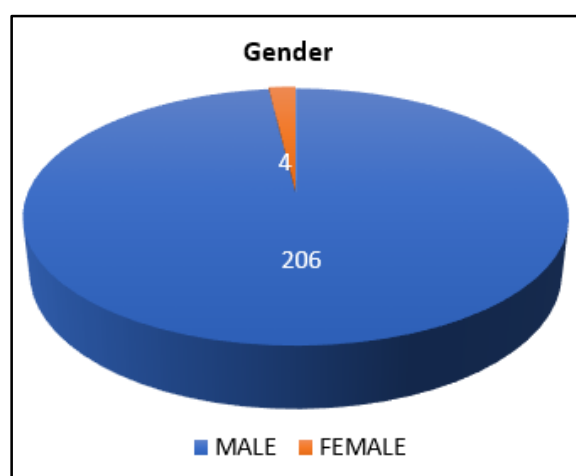


Figure 2: Gender

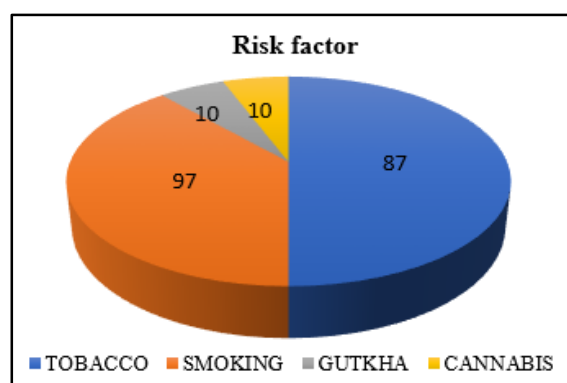


Figure 3: Risk factor

3.2. Gender

Among 210 populations, in that most were male—206 patients (98.1%). Only 4 were female (1.9%). This big difference in gender shows that males made up almost all the patients. Knowing gender distribution helps doctors understand health trends and give the right care to each group which observed in **Figure 2**.

3.3. Risk factor

Alcohol Dependence Syndrome (ADS) is a serious problem where people feel a strong need to drink alcohol. In a study of 210 ADS patients, 174 (82.9%) had other risk factors. Tobacco use was seen in 87% (n=50), smoking in 67% (n=38.5), gutkha in 10% (n=5.75), and cannabis in 10% (n=5.74) which observed in **Figure 3**.

3.4. Patient history

Out of 210 patients, 122 (58.1%) had medical and family history records, while 60 (28.6%) had no records. This shows how important it is to collect full history in hospitals. It helps doctors understand family health problems, other diseases, and plan better treatment for the patients which observed in **Table 1**.

Table 1: Patient history

Patient	Frequency	Percentage
Medical History	138	65.71
No History	72	34.28
Family History	139	66.19
No History	71	33.8
Total	210	100

3.5. Comorbidity

Out of 210 patients, 100 (47.6%) had other health problems. The most common were diabetes (24 patients, 11.4%) and high blood pressure (18, 8.6%). Others had kidney, thyroid, heart, or brain issues. Some had rare problems like liver disease or dengue. This shows the need for complete and careful treatment which observed in **Figure 4**.

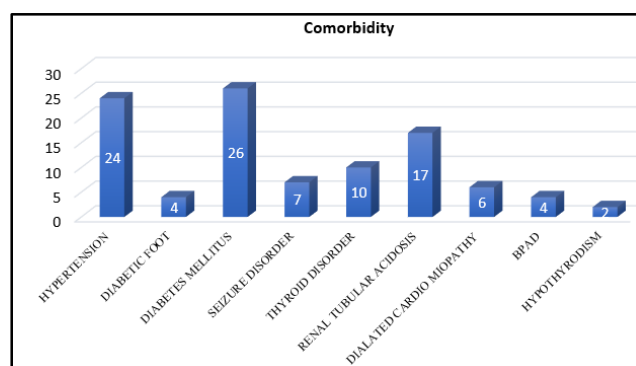


Figure 4: Comorbidity

3.6. Alcohol consumption history

In a study of 210 patients with Alcohol Dependence Syndrome (ADS), different alcohol use durations were found. About 7% (n=3.3) drank for less than 1 year, 33% (n=15.71) for 1–5 years, and the highest group, 50% (n=23.80), for 6–10 years. Around 41% (n=19.52) used alcohol for 11–15 years, 43% (n=20.47) for 16–20 years, and 24% (n=11.42) for 21–25 years. A smaller number drank for longer—9% (n=4.28) for 26–30 years and 3% (n=1.42) for

31–35 years. This shows that many patients have been using alcohol for a long time and need early help and proper treatment which observed in **Figure 5**. In this Alcohol Dependence Syndrome study, patients consumed alcoholic drinks such as beer, wine, whiskey (most common), rum, and vodka.

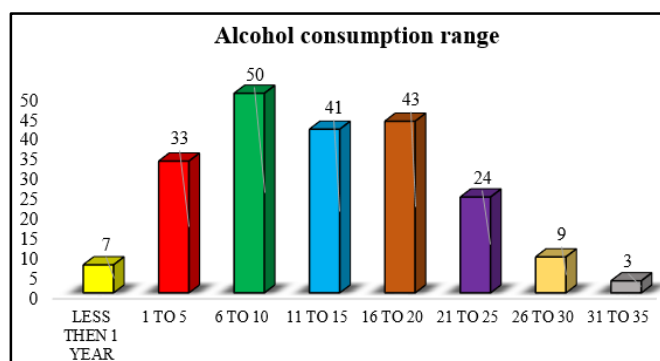


Figure 5: Alcohol consumption range

3.7. ADS type

In a study of 210 patients with Alcohol Dependence Syndrome (ADS), 93 patients (44.3%) had Type 1 ADS, 59 patients (28.1%) had mild ADS, and 58 patients (27.6%) showed both Type 1 and mild ADS signs. This shows different types of ADS are common and need proper care which observed in **Figure 6**.

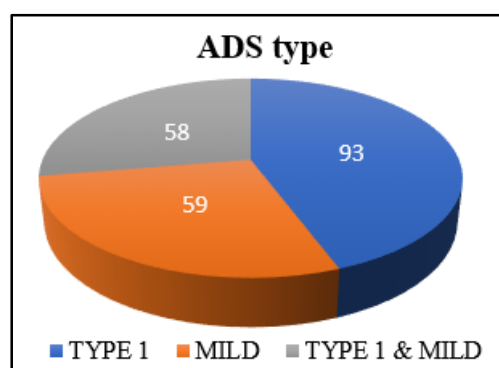


Figure 6: ADS type

3.8. Special treatment

In a study of 290 prescriptions, Tablet Diazepam was used most (69, 23.79%), followed by Tablet Lorazepam (67, 23.10%), Injection Lorazepam (23, 7.93%), and Tablet Risperidone (24, 8.27%). Other medicines included Olanzap (20, 6.89%), Olimeit and Lopez (12 each, 4.13%), Valium (9, 3.10%), and others. These show benzodiazepines are commonly used for alcohol withdrawal, along with antipsychotics and antidepressants for mental health support which observed in **Table 2**.

Table 2: Special treatment

Special medication	Frequency	Percentage
Tab Lorazepam	67	23.10
Inj Lorazepam	23	7.93

Tab Risperidone	24	8.27
Tab Amitriptyline	3	1.03
Tab Diazepam	69	23.79
Inj Diazepam	6	2.06
Tab Olanzap	12	4.13
Tab Elivel	3	1.03
Tab Olanzap	20	6.89
Tab Siozodon	6	2.06
Tab Clonazepam	3	1.03
Tab Lopez	12	4.13
Inj Lopez	8	2.75
Tab Fluoxetine	3	1.03
Tab Valium	11	3.79
Tab Chlordiazepoxide	5	1.72
Tab Lithium	9	3.10
Tab Ativan	4	1.37
Tab Sertraline	2	0.68
Total	290	100

3.9. Prescribed medication

In this population, a total of 1832 drugs were given. The most used were Vitamin (244, 13.31%), Lorazepam (216, 11.79%), Pantoprazole (174, 9.49%), Diazepam (113, 6.16%), and Haloperidol (82, 4.47%). Others included Ondansetron, Baclofen, Methylcobalamin, Risperidone, Olanzapine, Insulin, and Lactobacillus. All other drugs together made up 683 (37.28%). This shows vitamins and sedatives were mostly used in treatment which observed in **Table 3**.

Table 3: Prescribed medication

Prescribed Medication	Frequency	Percentage
Vitamin	244	13.31
Lorazepam	216	11.79
Pantoprazole	174	9.49
Diazepam	113	6.16
Haloperidol	82	4.47
Ondansetron	77	4.20
Baclofen	66	3.60
Methylcobalamin	63	3.43
Risperidone	45	2.45
Olanzapine	36	1.96
Insulin	17	0.92
Lactobacillus	16	0.87
Others	683	37.28
Total	832	100

3.10. Drug – Drug interaction

Out of the 210 data points, 139 involved drug-drug interactions, resulting in a total of 160 interactions. The most frequent interactions included Lorazepam and Risperidone 21.8%, classified as moderate, Lorazepam and Fluoxetine 18.75%, classified as minor.

Table 4: Drug – drug interaction

Variables	Major	Frequency	Percentage (%)
Severity	Major	2	1.25%
	Moderate	128	80%
	Minor	30	18.75%
Number of DDIs	One	110	68.75%
	Two	18	11.25%
	Three	15	9.37%
	Four	9	5.62%
	Five	8	5%
Type of Interaction	Pharmacokinetic Interaction	25	15.62%
	Pharmacodynamic Interaction	135	84.37%
Pharmacokinetic Interaction	Absorption	10	40%
	Distribution	2	8%
	Metabolism	9	36%
	Excretion	4	16%
Pharmacodynamic Interaction	Synergism	85	62.96%
	Antagonism	45	33.33%
	Additive	5	3.7%

Table 5: WHO indicator

WHO Core Indicator	Percentage of Prescriptions (%)
Average number of drugs per prescription	8.72
Percent of drugs prescribed from EDL	42.54
Percent of drugs prescribed by generic names	27.40
Percent of antibiotics per prescription	25.21
Percent of prescriptions with at least one injection	92.38

Table 6: Cost analysis

Drug composition	Package unit	JAS MRP	No of brands	Highest brand MRP	Lowest brand MRP	Brand Avg price	Std Dev of brands	% highest	% average	% lowest
Diazepam 10 mg	10 tabs	20	9	103.77	25	40.51	25.04	418%	102%	25%
Olanzapine 5 mg	10 tabs	6.6	100	129	34	42.16	13.38	1854%	538%	415%
Risperidone 1 mg	10 tabs	8	91	274.77	8.11	25.82	29.14	3334%	222%	1%
Sertraline 50 mg	10 tabs	18	100	197.11	52.12	77.43	23.91	995%	330%	189%
Haloperidol 5 mg	10 tabs	32	12	122.27	32.11	71.33	29.48	294%	130%	3%

Major interactions identified was Aripiprazole and Metoclopramide 1.25%. 139 drug-drug interactions were found according to the degree of severity, moderate was 80%, minor 18.75% and major 1.25% and of which 110 cases had just 1 interaction, 9 cases had four interactions. The highest type of interaction was found to be pharmacodynamics interaction which is 84.37% followed by pharmacokinetics interaction 15.62%. Out of 25 pharmacokinetics interaction absorption 40%, distribution 8%, metabolism 36% and excretion 16%. Out of 135 pharmacodynamics interaction synergism was 62.96%, antagonism 33.33%, and additive 3.7% which observed in **Table 4**.

3.11. WHO indicator

In this study analyzed 210 ADS patient's prescriptions, according to WHO core-indicator the average number of

drugs per prescription was-8.72. It was noticed that 42.54% and 27.40% of all medicines were chosen from the essential medicines list and generics respectively. Antibiotics accounted for 25.21% of all prescribed drugs and injectable dosage forms for 92.38% which observed in **Table 5**.

3.12. Cost analysis

In a study of 1,832 medicines used for different health problems, vitamins were given most (293, 15.99%), followed by benzodiazepines (492, 26.85%), and antibiotics and painkillers (200 each, 10.92%). Medicines for blood pressure, diabetes, depression, and stomach issues were also common. Most generic drugs cost ₹1–10, but branded ones were costlier, some up to ₹1,000. Psychiatric drugs like Diazepam, Olanzapine, and Risperidone had many brands with large price gaps. For example, Risperidone prices

ranged from ₹8.11 to ₹274.77. This big difference shows less price control, which can make it hard for some patients to buy the medicines they need which observed **Table 6**.

4. Discussion

This study shows a strong link between alcohol dependence and depression, which affects how doctors choose antidepressants. SSRIs are the most used because they work well and have fewer side effects. Treatment costs vary, so planning should consider money and patient needs to give better, more personal mental health care.

Among the 210 study subjects, most of the subjects were under the age group of 38 – 47 [46.66%]. This study conducted by Seung-Ah Choe et al showed a similar result in their study with 36.23%.³

Out of 210 patients most of them male patients then the women patients as 206 [98.09%]. This study conducted by Seung-Ah Choe et al showed a similar result in their study with 96.4 %.³

Most of patients are unmarried 176 [83.8%]. This study conducted by Kenneth S. Kendler, M.D et al and So-Hyun Lee et al showed a similar result in their study with 69.21% and 63.2%.^{5,18}

Total subjects most risk factor survived are tobacco 87 [50%] and smoking 67 [38.5%], other factors like gutkha 10 [5.74%], cannabis 10 [5.74%]. This study conducted by Meredith C. Meacham et al showed a similar result in their study with 35.2% for tobacco use.⁶

Most of the patients have a medical and family history before admitting to the hospital, medical history having 138 [65.71%] and 72 [34.28%] with no medical history, family history having 139 [66.19%] and 71 [33.8 %] with no family history. This study conducted by So-Hyun Lee et al showed a similar result in their study with family history having 71.04% a without family history 28.95%.^{18,19}

Diabetes mellitus and hypertension are the most prevalent comorbidities identified in patients, accounting for 26 [26%] and 24 [24%] of the study subject respectively. This study conducted by George Fein, Ph.D. et al showed a similar result in their study hypertension 20.2%.⁴

The study shows alcohol consumption range yearly most of the 6 – 10 years and 16 – 20 years are patients take alcohol contiously as 50 [28.8%] and 43 [20.47%], other than less than 1 year 1 [3.33%], 1 – 5 years 33 [15.71%], 11 -15 years 41 [19.52%], 21 – 25 years 24 [11.42%], 26 – 30 years 9 [4.28%], 31 – 35 years 3 [1.42%]. Average alcohol consumption range monthly 164.45% and yearly 13.7 %. This study conducted by S. Mahasampath Gowri et al showed a similar result in their study alcohol consumption was 54.5 % and 47.7 %.²⁰

In behavioral therapy of alcohol dependence syndrome, there are two therapies as Mental Status Examination and Eye to Eye Contact which is 201 [75.84%] and 64 [24.15%]. This study conducted by Kimberly Goodyear et al showed a similar result in their mental examination 46.25%.²¹

In this study there are two types of alcohol dependence syndrome most frequently Type 1 as 93 [44.28%], mild 59 [28.09%] and some patients having type 1 with mild as 58 [27.61%]. This study conducted by Michie N. Hesselbrock et al showed a similar result in their 28.2 %.^{2,3}

In this study the most special used drug was Tablet Diazepam 10 mg 69 [23.79%], Tablet Lorazepam 2 mg 67 [23.1%], Injection Lorazepam 2 mg 23 [7.93%], Tablet Risperidone 1 mg 24 [8.27%] and other consists of [36.89%]. This study conducted by Timothy I. Mueller et al showed a similar result in their diazepam 10 mg 25.2%.¹³

In this study the most prescribed drug was Tablet Vitamin 244 [13.31%], Tablet Lorazepam 2 mg 216 [11.79%], Tablet Pantoprazole 40 mg 174 [9.49%], Tablet Diazepam 10 mg 113 [6.16%], and other consists of [37.28%]. This study conducted by Iga Stokłosa et al showed a similar result in their Acamprosate, 12.54%, and baclofen 11.2%.⁹

Lorazepam and Risperidone were determined to have the highest number of interactions, with a count of 35 [21.87%] which was a moderate interaction followed by Lorazepam and Fluoxetine with a count of 30 [18.75%] which is a minor interaction. According to the data we find 1 major drug interaction is Aripiprazole and Metoclopramide 2 [1.25%]. Out of 210 prescription 160 prescriptions had drug interactions among which the highest interactions were found to be moderate interaction [80%] and 110 cases had at least 1 drug interaction. Here pharmacodynamic interaction was found to be more with a count of 135 [84.37%], in pharmacodynamic interaction synergism was found to be 85 [62.96%], antagonism and additive were found to be 45 [33.33%] and 5 [3.7%]. In pharmacokinetic interaction was found to be more with count of 25 [15.62%], in pharmacokinetic interaction absorption, distribution, metabolism and elimination were found to be 10 [40%], 2 [8%], 9 [36%], and 4 [16%]. A comparable study by Gracia Santos-Díaz et al. found that the moderate, medium, and major factors were Tramadol + Trazodone 3.8% and Levothyroxine + Omeprazole 10.7%. Ferrous Sulphate + Omeprazole 1.3%.²²⁻²⁴

There were 8.72 drugs per prescription, the percentage of generic drugs used in the study is 502 [27.4%] compared to the brand drug which is 1330 [72.59%] with a total drug used of 1832. The percentage of injections prescribed was 194 [92.38%]. The average number of antibiotics per prescription was 2.2. The percentage of vitamin and iron prescribed was 90.47 %. In this study, we found that out of 1832 medications 359 [19.59%] of the medications are

essential according to WHO core indicators. P. Galappaththy et al, done a similar study which found out Overall, the average number of medicines per encounter was 3.1 Medicines prescribed from EML 23.8%, Medicines prescribed in generic name 35.5% Encounters with an antibiotic 23.8%, Encounters with an injection 1.2%.²⁵

The total number of drugs used in discharge medication among 210 patients is 854, with the most used drug the Tablet Baclofen 20 mg.

In cost analysis average cost, and compare generic and brand cost, there are p value is statistically significant. Out of 1832 drugs most drugs are under category of Benzodiazepam are as generic and brand as 492. This study conducted by Mohith N et al showed a similar result of most drugs used under category of Antibiotics.²⁶

Cost compression of medicines for anti-depression medication therapeutic significantly. This study conducted by Prasad T A et al showed a similar result cost compression of medicines for Cardiovascular, Anti-infectives, Gastrointestinal, Anti-diabetic, Respiratory therapeutic significantly.²⁷

5. Conclusion

This cross-sectional study looked at the health, prescription patterns, and treatment costs of antidepressant use in people with Alcohol Dependence Syndrome (ADS). A total of 210 patients were studied, most of them men (98.09%) and unmarried (83.8%). The largest age group was 38–47 years (46.66%), followed by 28–37 years (32.85%). The main risk factors were tobacco use (50%) and smoking (38.5%). Many patients had a medical history (65.71%) and family history (66.19%) of illness, mostly diabetes (26%) and high blood pressure (24%). Alcohol use was highest in people drinking for 6–10 years (28.8%) and 16–20 years (20.47%). Most patients had a Mental State Examination (75.84%) and some had Eye-to-Eye Contact Therapy (24.15%). The most common type of alcohol dependence was Type 1 mild (44.28%). On admission, Diazepam (23.79%) and Lorazepam (23.1%) were the most used medicines. During treatment, vitamins (13.31%) and Baclofen (13.58%) were common. Each prescription had an average of 8.72 medicines, with 92.38% including both tablets and injections, and an average of 2.2 antibiotics. Out of 1832 total medicines, 72.59% were brand-name and 27.4% were generic, with vitamins and iron in 90.47% of prescriptions. There were 160 drug interactions, mostly moderate, with Lorazepam–Risperidone being the most common (17.5%). At discharge, Baclofen 20 mg (13.58%) and Methylcobalamin 2000 mg (11.41%) were most used. Benzodiazepines were the most prescribed group (492 medicines). The cost analysis showed a large difference between brand and generic drugs.

ADS patients often have other health problems, leading to high medicine use and multiple prescriptions. Most drugs

were brand-name, increasing costs, even though cheaper generic options were available. The study suggests the need for integrated mental health care, careful selection of medicines, and cost-conscious prescribing to improve both treatment results and affordability.

6. Limitations

This study has some limits. It cannot show cause and effect or look at long-term results. It uses self-reported data and medical records, which may not always be correct. There could also be bias in choosing patients and not checking for other mental health issues. The cost study might not show the full money burden because it doesn't include hidden or indirect costs.

7. Future Directions

Future studies should look at how antidepressants work over a long time in people with alcohol problems. They should also check how other mental health issues affect treatment and include what patients say about their health. Studying the costs and using new tools like health apps and genetic testing may help find better, more personal treatments and make it easier for patients to follow their treatment plans.

8. Ethics Approval

The ethical clearance letter number: SIMS & RC / EC-06/RR-10/ 2025-26 dated 05/05/2025 was obtained from the institution.

9. Author Contributions

The conception and design of the study were collaboratively undertaken by Animesh Das, Ritwam Mukhopadhyay, E. Sateesh Kumar, Padma L., and Vibha Manu Md. Material preparation, data collection, and data analysis were performed by Animesh Das and Ritwam Mukhopadhyay. Animesh Das and Ritwam Mukhopadhyay wrote the initial draft of the manuscript. All authors checked and gave suggestions on the earlier drafts and agreed to the final version for submission.

10. Availability of Data and Material

Not applicable.

11. Source of Funding

None.

12. Conflict of Interest

None.

13. Acknowledgements

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