

Evaluation of Drug Utilization Patterns and Prescription Trends in Patients with Hypothyroidism and Hyperthyroidism in a Tertiary Care Hospital

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Abstract

Background: Endocrine disorders affecting the thyroid gland represent some of the most frequently encountered conditions globally, necessitating prolonged therapeutic intervention and vigilant clinical surveillance. The evaluation of Drug utilization patterns (DUE) serves an essential function in examining prescriptive behaviours and promoting appropriate pharmaceutical management. **Objective:** To evaluate drug utilization patterns, prescribing trends, and rationality of therapy in patients with hypothyroidism and hyperthyroidism. **Methods:** A prospective, cross-sectional observational investigation was performed across six months within the ambulatory care division of a tertiary healthcare facility. The study encompassed 200 patients with confirmed thyroid pathology. Data were collected from prescriptions and patient interviews and analysed using WHO prescribing indicators. **Results:** Among 200 patients, hypothyroidism was more prevalent (70%) than hyperthyroidism (30%), with a higher proportion of females (70%). Levothyroxine was the most commonly prescribed drug in hypothyroid patients, while carbimazole was predominantly used in hyperthyroidism. Co-prescription of calcium and iron supplements was frequent. Mild polypharmacy (25%) and drug–drug interactions, particularly involving levothyroxine, were observed. Prescribing practices were largely consistent with clinical guidelines. **Conclusion:** The study demonstrates largely rational prescribing patterns in thyroid disorder management. However, improved monitoring and awareness of drug interactions are essential to optimize therapeutic outcomes.

Keywords: Drug utilization, hypothyroidism, hyperthyroidism, levothyroxine, carbimazole, who prescribing indicators

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INTRODUCTION

Thyroid disorders constitute prevalent endocrine pathologies on a global scale, impacting substantial populations and presenting considerable healthcare burdens. Within India, thyroid dysfunction demonstrates notable prevalence across demographic groups. These conditions encompass primarily hypothyroid states, marked by diminished glandular activity, and hyperthyroid conditions, characterized by excessive glandular function, both potentially resulting in serious sequelae without appropriate intervention. The coexistence of additional medical conditions, including hypertensive disease, diabetes mellitus, and cardiac pathologies, compounds therapeutic complexity, as these disorders frequently necessitate comprehensive treatment strategies [1, 2].

Effective management of thyroid disorders relies on a well-defined drug utilization pattern that not only ensures efficacy but also minimizes adverse effects. Rational prescribing, guided by frameworks such as the World Health Organization (WHO) prescribing indicators and the National List of Essential Medicines (NLEM), can help ensure that patients receive safe, cost-effective, and appropriate medications based on their individual needs and co existing health conditions. Examination of pharmaceutical utilization trends consequently offers meaningful perspectives regarding contemporary prescriptive approaches and opportunities for enhanced clinical outcomes [3–5].

This study aims to assess the drug utilization patterns among patients with thyroid disorders, both with and without comorbidities, visiting a tertiary care hospital. By evaluating the alignment with WHO indicators and NLEM, this study intends to provide a framework for rationalizing and optimizing treatment approaches in thyroid care [6].

MATERIALS AND METHODS

Study Design and Setting

A prospective, cross-sectional observational investigation was undertaken within the ambulatory care department of a tertiary academic medical center located in Kanpur, Uttar Pradesh.

Study Duration

The study was carried out over a period of six months.

Study Population and Sample Size

A total of 200 patients diagnosed with hypothyroidism or hyperthyroidism were included.

Inclusion Criteria

- Patients aged ≥ 18 years
- Diagnosed cases of hypothyroidism or hyperthyroidism
- Patients receiving pharmacological treatment
- Patients willing to participate

Exclusion Criteria

- Pregnant and lactating women
- Patients with incomplete prescriptions
- Patients unwilling to participate

Data Collection

Data were collected using:

- Prescription records
- Patient interviews

The documented parameters encompassed demographic characteristics, diagnostic information, medication prescriptions, dosing regimens, administration frequency, concomitant therapies, and laboratory findings.

Study Parameters

- Drug utilization patterns
- WHO prescribing indicators
- Polypharmacy
- Drug–drug interactions
- Appropriateness of therapy

Statistical Analysis

Analysis of the data was conducted utilizing Microsoft Excel, with results presented as frequencies and percentages.

RESULT

The investigation incorporated 200 participants. Hypothyroidism demonstrated higher prevalence (70%) relative to hyperthyroidism (30%). The study cohort was predominantly comprised of female participants, as detailed in Table 1 and Table 2.

Table 1. Distribution of thyroid disorders.

Condition	Number (n=200)	Percentage (%)
Hypothyroidism	140	70%
Hyperthyroidism	60	30%

Table 2. Gender distribution.

Gender	Number	Percentage (%)
Male	60	30%
Female	140	70%

Levothyroxine was the most commonly prescribed drug for hypothyroidism, consistent with its established role as the standard replacement therapy. Carbimazole and methimazole were predominantly used in hyperthyroid patients, often in combination with beta-blockers for symptomatic relief Table 3.

Table 3. Commonly prescribed drugs.

Drug name	Indication	Frequency (%)
Levothyroxine	Hypothyroidism	70%
Carbimazole	Hyperthyroidism	25%
Beta-blockers	Symptomatic relief	20%
Calcium	Supplement	40%
Iron	Supplement	35%

Co-prescription of calcium and iron supplements was frequently observed, particularly in hypothyroid patients. Mild polypharmacy was identified in a subset of patients, with most prescriptions containing 2–3 drugs Table 4.

Table 4. Polypharmacy

Category	Patient	Percentage (%)
<5 drugs	150	75%
≥5 drugs	50	25%

Drug–drug interactions were noted, especially between levothyroxine and calcium or iron supplements, which are known to reduce its absorption. Overall, prescribing patterns were found to be rational and largely aligned with WHO prescribing indicators and essential medicine guidelines Table 5.

Table 5. Drug-drug interactions.

Interaction	Effect
Levothyroxine + Calcium	Reduced absorption
Levothyroxine + Iron	Reduced bioavailability

WHO Prescribing Indicators

Analysis of prescribing indicators revealed that the average number of drugs per prescription was between 2–3, indicating relatively low polypharmacy. The use of injections was minimal, and most drugs were prescribed from the essential drug list, reflecting adherence to rational prescribing practices.

DISCUSSION

This investigation examined medication utilization patterns and prescriptive practices among patients presenting with thyroid pathologies at a tertiary healthcare facility. The findings demonstrated that hypothyroidism was more prevalent than hyperthyroidism, with a marked female predominance. These observations are consistent with contemporary epidemiological evidence consistent with previously reported epidemiological trends indicating higher prevalence of hypothyroidism in females [7, 8].

The predominance of hypothyroidism (70%) observed in this study aligns with recent global trends showing increasing diagnosis and treatment of hypothyroid conditions. A recent population-based study reported a steady rise in levothyroxine use worldwide, reflecting both increased disease detection and long-term treatment requirements [9]. Similarly, patient-related factors such as health awareness and improved screening have contributed to higher reported prevalence rates.

Levothyroxine was the most commonly prescribed drug in hypothyroid patients, which is in accordance with its established role as the standard of care. Recent evidence confirms that levothyroxine remains the cornerstone of therapy due to its predictable pharmacokinetics and effectiveness in restoring euthyroid status. Furthermore, recent studies have emphasized that appropriate dosing and adherence to therapy significantly influence clinical outcomes and quality of life in hypothyroid patients [10].

In hyperthyroid patients, carbimazole (and methimazole) were the most frequently prescribed antithyroid drugs, consistent with current clinical practice. The use of beta-blockers for symptomatic management further supports rational prescribing behaviour. These findings are in agreement with contemporary studies that highlight the effectiveness of antithyroid drugs in achieving hormonal control and improving patient outcomes [8].

A significant observation in the present study was the frequent co-prescription of calcium and iron supplements along with levothyroxine. Although these therapeutic agents are frequently clinically warranted, they are recognized for their capacity to impair levothyroxine absorption. Contemporary research has validated that such pharmaceutical interactions may diminish drug bioavailability and result in inadequate therapeutic outcomes when not properly addressed [9, 10]. This underscores the significance of appropriate dosing schedules and comprehensive patient counselling regarding medication administration protocols.

Polypharmacy was observed in 25% of patients, indicating relatively rational prescribing practices compared to other chronic disease conditions. However, even mild polypharmacy can increase the risk of drug interactions and affect medication adherence. Recent research has emphasized that patient compliance plays a critical role in achieving optimal thyroid function control, with factors such as health literacy and treatment complexity influencing adherence [11].

The evaluation of prescribing patterns using WHO indicators revealed that most prescriptions contained an average of 2–3 drugs, suggesting rational drug use. These findings are consistent with previous drug utilization studies, which have reported similar prescribing trends in thyroid disorder management [12].

Overall, the study findings indicate that prescribing practices were largely rational and aligned with current clinical standards. However, the presence of drug–drug interactions and the need for improved monitoring highlight areas for clinical improvement. Recent literature emphasizes that optimized dosing strategies, patient counselling, and regular monitoring of thyroid function tests are essential for achieving better therapeutic outcomes.

LIMITATIONS

This investigation was performed at one academic medical facility with a comparatively limited number of participants. Long-term monitoring was not incorporated into the research design, potentially restricting the broader applicability of the results.

CONCLUSION

The current investigation reveals that medication usage patterns among individuals with thyroid conditions were predominantly appropriate and consistent with recognized clinical protocols. Hypothyroidism was found to be more prevalent than hyperthyroidism, with a higher proportion of female patients. Levothyroxine remained the most frequently prescribed drug for hypothyroidism, while carbimazole was commonly used in the management of hyperthyroidism.

The study also identified mild polypharmacy and clinically relevant drug–drug interactions, particularly involving levothyroxine and calcium or iron supplements, which may affect therapeutic efficacy. Although overall prescribing practices were appropriate, these findings highlight the need for improved monitoring, patient counselling, and awareness of potential drug interactions.

Furthermore, adherence to WHO prescribing indicators suggests that rational drug use principles are being followed in the study setting. However, continued efforts are required to optimize prescribing practices through regular evaluation, clinician awareness, and patient education.

In conclusion, this study underscores the importance of drug utilization evaluation as a tool for enhancing the quality of healthcare delivery and supports the need for ongoing monitoring to ensure safe, effective, and evidence-based management of thyroid disorders.

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