

primary pathological mechanism or key symptoms, has a well-defined therapeutic indication, and occupies an absolutely dominant position in both sales revenue and frequency of use. By comparison, adjunctive medications are mainly used to alleviate accompanying symptoms, reduce adverse reactions, or improve overall treatment adherence, and therefore account for a relatively limited range of use and a smaller share of total sales.

Previous studies have shown that, in high-concentration diseases, core drugs generally exhibit low clinical substitutability. This is attributable, on the one hand, to their strong evidence base and well-established therapeutic efficacy, and on the other hand, to their high degree of consistency with clinical guidelines and empirical medication pathways. As a result, patients and pharmacists tend to adhere to existing regimens in actual medication decision-making, and medication pathways display a high level of stability and predictability (Bektay et al., 2025; Malekzadeh et al., 2025). Consequently, the medication-use structure for these diseases is overall characterized by a high degree of concentration in drug varieties, simple combination patterns, and low variability, which is particularly evident at the retail pharmacy level (Table 2).

Table 2 Examples of medication combination structures for high-concentration diseases

Rank	Drug Name	Share of Sales Revenue
1	Core antihypertensive/lipid-lowering drug	High
2	Adjunctive traditional Chinese medicine	Moderate
3	Other concomitant medications	Low

3.3 Heterogeneity characteristics of diseases with low to moderate concentration

Medication combinations for diseases with low to moderate concentration exhibit pronounced heterogeneity, as their medication-use patterns lack a clearly dominant single drug and show substantial variation in drug choices across patients. In real-world practice, traditional Chinese medicines and chemical drugs often coexist. Some patients tend to prefer traditional Chinese medicines that offer holistic regulation or relief of multiple symptoms, whereas others favor chemical drugs with clearly defined targets and faster onset of action. As a result, the overall medication-use structure for these diseases displays a high degree of diversity.

Moreover, medication decision-making for these diseases is more susceptible to non-clinical factors. On the one hand, patients' prior medication experiences, levels of health literacy, and subjective perceptions of drug safety partially shape their medication preferences. On the other hand, pharmacists' professional advice, recommendation habits, and promotional strategies in retail pharmacies also play an important role in the purchasing process. At the same time, drug prices and the trade-offs between cost and therapeutic effectiveness—particularly in contexts with a high proportion of out-of-pocket payment—further exacerbate differences in medication combinations (Ahmadipour and Sarafinejad, 2024; Gülpınar et al., 2024). Consequently, diseases with low to moderate concentration tend to exhibit medication-use characteristics at the retail pharmacy level that are marked by dispersed drug varieties, flexible combination patterns, and high structural volatility (Table 3).

Table 3 Distribution characteristics of medication combinations for diseases with low concentration

Disease Category	Share of Core Drugs	Number of Concomitant Drugs	Share of Traditional Chinese Medicines
Gastrointestinal Diseases	Moderate	Many	Moderate
Sleep Disorders	Moderate	Moderate	Moderate
Conditioning-Related Diseases	Low	Many	High

4 Discussion

Based on real-world data from retail pharmacies, this study systematically characterizes the concentration and heterogeneity of medication-use structures for common diseases from a meso-level analytical perspective centered on “medication combinations.” The findings indicate that medication combinations for common diseases in retail pharmacies overall exhibit a structural pattern in which a small number of high-frequency core combinations dominate, alongside a large number of low-frequency long-tail combinations. This structure differs both from the