

# Trend Analysis of Chemical Drug Additives (BKO) in Indonesian Herbal Medicines: A Case Study 2019-2024

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## ABSTRACT

This study analyses supervision trends regarding Herbal Medicines containing pharmaceutical chemicals (BKO) in Indonesia from 2019 to the third quarter of 2024. Compounds like sildenafil, dexamethasone, paracetamol, and sibutramine are frequently added for quick effects, despite posing serious health risks. Based on data from the Indonesian Food and Drug Authority (BPOM), this study explores BKO distribution patterns in informal sectors, such as traditional stalls and depots, which often lack sufficient oversight. Findings indicate an increased distribution of high-risk products in these areas, often without appropriate labelling or quality control. This study also underscores the need for education and guidance for small producers who often lack regulatory understanding. The results are intended to support more effective policies in supervision and education to regulate BKO-containing products in the Herbal Medicine market and protect public health.

**Keywords:** *BPOM; Chemical Drug Additives; Consumer Safety; Herbal Medicine; Regulatory Oversight*

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## I. INTRODUCTION

In Indonesia, herbal medicine or "jamu" holds significant cultural value and is widely used as an alternative treatment. However, this high demand is often accompanied by the misuse of pharmaceutical chemicals (BKO) such as dexamethasone and sildenafil by producers who aim to enhance product efficacy without appropriate labelling. This practice poses serious health risks for consumers, particularly in informal distribution sectors, like unregistered traditional stalls and depots, where regulatory oversight is limited (Aulia et al., 2022; Widyowati & Agil, 2018).



Previous studies have documented the adverse effects of BKO, including cardiovascular risks and organ toxicity (Suparmi, 2020; Elfahmi et al., 2014); however, research focusing on BKO distribution patterns in informal sectors remains limited. The rising prevalence of BKO-containing products has raised significant concerns, especially given that many small-scale operators lack adequate knowledge of safe product regulations, potentially increasing consumer exposure to harmful substances (Elviana et al., 2022).

This study is crucial to strengthen regulatory supervision, particularly in informal sectors that are often overlooked by direct regulatory oversight. By analysing annual trends of BKO in herbal products and their distribution across various sales locations over the past five years, this research contributes new insights into the distribution patterns of BKO-containing products. The findings are expected to provide a solid foundation for formulating more effective regulatory policies, which include stricter enforcement and broader public education, thereby enhancing the literature on Herbal Medicine supervision in Indonesia and protecting public health.

## II. METHODS

Data were collected through BPOM's post-market surveillance, where samples were obtained from various distribution points, including traditional stalls, depots, drugstores, and pharmacies. The presence of BKO was tested using LC-MS, a highly sensitive technique capable of detecting active compounds like sildenafil and dexamethasone. This method has proven effective in identifying chemical substances within herbal products (Endah & Nofrialdi, 2020).

## III. RESULTS

The distribution of BKO-containing products predominantly occurs in informal channels like traditional stalls and depots, which operate with minimal oversight (Kim et al., 2013). These informal markets present unique challenges for regulators, as they typically evade the direct monitoring procedures applied to

formal retail environments. In contrast, regulated pharmacies, bound by stricter standards, are less prone to distributing these unsafe products (Elviana et al., 2022).

Table 1: Number of Products Containing BKO

Year	Dexamethasone	Paracetamol	Sildenafil	Sibutramine
2019	5	3	2	0
2020	11	9	17	4
2021	15	5	4	1
2022	7	12	10	5
2023	8	8	18	3
2024	4	1	11	2

This data underscores a troubling trend, as spikes in sildenafil use in 2020 and 2023 suggest increasing consumer reliance on quick-effect products. This trend is problematic as these substances, particularly sildenafil and dexamethasone, have known risks that can cause long-term health effects, including organ damage (Suparmi, 2020; Elfahmi et al., 2014).

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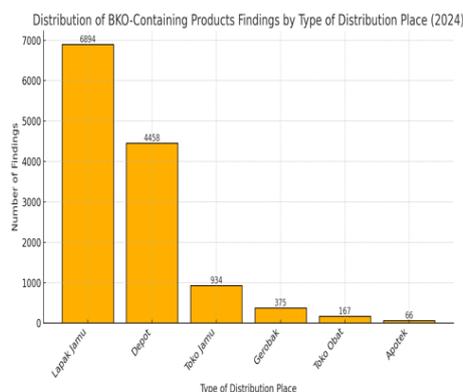


Figure 1. Distribution of BKO-Containing Products by Type of Distribution Place

The high distribution of BKO in informal channels underscores serious regulatory challenges, as these distribution locations are generally outside of strict regulatory control. The significant distribution through traditional stalls further highlights regulatory gaps, supporting the need for stricter control in this sector (Rahmadani et al., 2023; Ijaz et al., 2015). Geographically, BKO-containing products are more prevalent in Java and Sumatra, aligning with cultural preferences for herbal medicine, as shown in Figure 2.

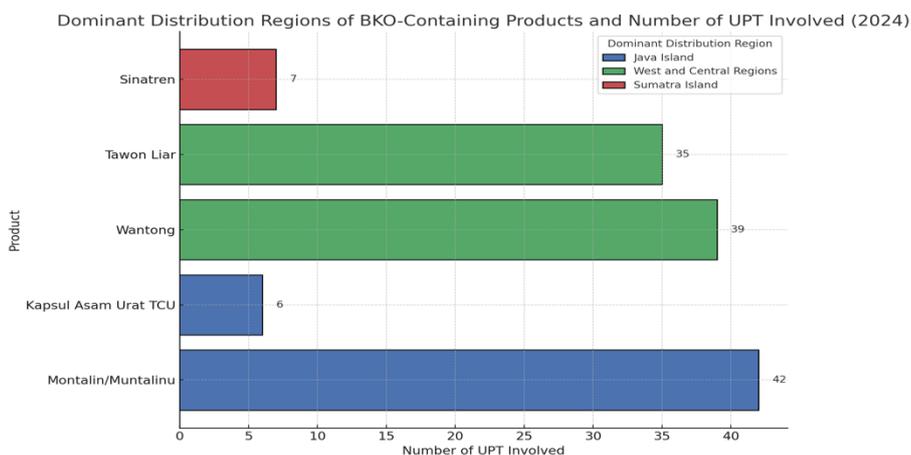


Figure 2. Regional Distribution of BKO Herbal Products in Indonesia

Most violations were found among Small Herbal Medicine Enterprises (UKOT), revealing frequent non-compliance with product safety standards. The limited regulatory knowledge and resources, as noted by Elviana et al. (2022), make these small-scale producers less likely to meet necessary safety standards.

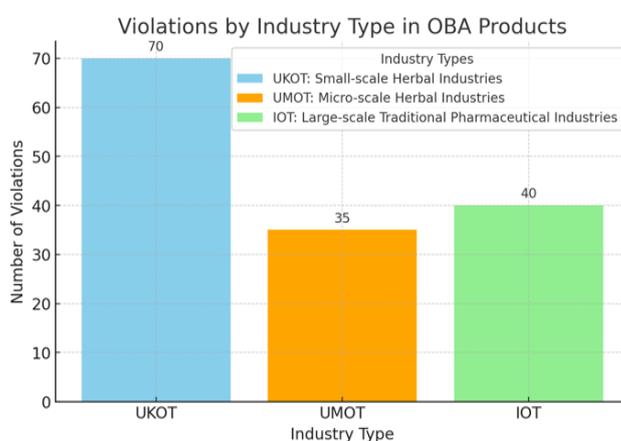


Figure 3. Types of Industries with Violations

Addressing the circulation of Herbal Medicines (OT) containing BKO requires a comprehensive eradication strategy involving increased oversight, sanctions, consumer education, and support for small industries. BPOM can enhance field

inspections by collaborating with local governments and health institutions to reach informal sectors, including traditional stalls and depots, which serve as primary distribution channels for BKO products (Carè et al., 2021; Ngcobo et al., 2011). Broader inspection coverage is expected to curtail the circulation of unsafe products early. Furthermore, implementing stringent sanctions for violations, especially within Small Herbal Medicine Enterprises (UKOT), coupled with training programs, can also promote compliance with safety standards (Elviana et al., 2022).

Additionally, consumers need to be informed about the risks associated with BKO. Comprehensive health campaigns can encourage consumers to be more selective when purchasing herbal products, reducing the demand for risky instant products (Rahmadani et al., 2023). BPOM's collaboration with health institutions and local communities is anticipated to broaden the reach of these educational efforts, fostering collective awareness of the importance of choosing safe products (Ngcobo et al., 2011). Developing suitable production standards for UKOT, which often face resource limitations, is also necessary to enable safe and compliant production (Elviana et al., 2022). This eradication strategy is expected to not only curb the circulation of BKO herbal products but also establish a sustainable regulatory and production system focused on public health.

#### IV. CONCLUSION AND SUGGESTION

This study reveals an increasing trend in BKO use within traditional herbal products in Indonesia, with sildenafil and dexamethasone frequently found, particularly in informal distribution channels such as traditional stalls and depots. These findings underscore the necessity of stricter oversight and collaboration among BPOM, local governments, and health institutions to curtail the distribution of high-risk products. Effective policy implementation, consumer education, and guidance for small producers are essential steps in reducing BKO usage. Strengthening regulations, establishing production standards, and conducting health campaigns are expected to enhance consumer protection, safeguarding public health from exposure to unsafe products.

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