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Accounting Information Systems for Inventory Management and Selling Price Determination in Wholesale Trading Companies

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Abstract

Background: Inventory management and selling price determination are critical in wholesale trading companies because inventory represents a substantial portion of working capital, while pricing decisions depend on accurate cost information. Previous studies have generally examined accounting information systems (AIS) for inventory management and selling price determination separately or within single-company case studies. This leaves a gap in empirical evidence integrating AIS-based inventory cycle efficiency with variable costing and selling price determination across comparable publicly listed wholesale companies.
Objective: This study examines how inventory AIS supports inventory cycle management and selling price determination through a variable costing approach, while identifying the relationship between inventory turnover and implicit mark-up.
Methods: A descriptive-comparative quantitative approach was applied to the audited financial statements of five companies listed on the Indonesia Stock Exchange UNTR, HEXA, KOBX, INTA, and AKRA over the 2022–2025 period. Financial data were standardized into millions of Indonesian rupiah and analyzed using inventory turnover (ITO), days inventory outstanding (DIO), gross profit margin (GPM), and implicit cost-plus mark-up.
Results: The findings reveal substantial differences in inventory efficiency and pricing patterns. AKRA recorded the highest inventory turnover, reaching 16.12 times in 2025, with the lowest mark-up of 9.78%, whereas KOBX recorded the lowest inventory turnover, at 1.02 times in 2023, and a substantially longer inventory age.
Conclusion: Reliable inventory AIS supports more accurate cost information, enabling companies to align selling prices and mark-up strategies with inventory behavior and business conditions.

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INTRODUCTION

Inventory is one of the most material and strategically important current asset categories for trading companies. For entities engaged in the wholesale trade of machinery, spare parts, and accessories, merchandise inventory in the form of heavy equipment units and spare parts absorbs a substantial portion of working capital while simultaneously serving as a primary determinant of operational continuity. Suboptimal inventory management can give rise to several risks, including stock shortages (shortage costs) that result in lost sales opportunities, as well as excess inventory that incurs holding costs and increases the risk of inventory impairment. Therefore, a system capable of accurately monitoring, recording, and controlling inventory turnover is a

fundamental necessity for trading companies.

The Accounting Information System (AIS) plays a crucial role in the inventory cycle because it connects physical warehouse activities with the accounting recognition of inventory acquisition and disposal. Romney and Steinbart (2018, 2023) and Permatasari et al. (2024) explain that AIS is a structured framework that collects, processes, and presents transaction data as relevant, accurate, timely, and reliable information, thereby supporting management decision-making. Anggraeni and Winarningsih (2021) and Tran Thanh Thuy (2025) demonstrate that AIS quality influences the quality of accounting information, which in turn affects a company's financial performance. In the context of inventory, a systematic review by Ria et al. (2023) confirms that the implementation of AIS for inventory management provides benefits in the form of increased operational effectiveness, reduced storage costs, and improved accuracy of financial statements, as further supported by Hanani and Munandar (2025) in the trading company sector.

The information generated by AIS regarding inventory serves not only a recording function but also an important role in determining selling prices. One commonly used pricing approach is cost-plus pricing, which adds a predetermined margin to the cost base (Datar & Rajan, 2021; Horngren et al., 2022). To obtain relevant cost information for short-term decision-making, the variable costing approach separates variable costs from fixed costs, enabling management to conduct profit planning through cost-volume-profit analysis and contribution margin analysis (Atsalakis et al., 2026; Garrison et al., 2021; Ratnasih & Sulbahri, 2022). Prayogi et al. (2025) demonstrate that cost misclassification in the calculation of cost of goods sold directly affects the accuracy of selling price determination.

In trading companies, the cost component that exhibits variable behavior is dominated by the cost of merchandise acquisition. Meanwhile, operating costs such as salaries, rent, and depreciation are generally fixed within the relevant range. Thus, the logic of variable costing can be adapted so that the cost of merchandise sold becomes the primary variable cost, while the difference between sales revenue and the cost of merchandise sold, namely gross profit, can be used as an indicator of the amount available to cover operating expenses and generate profit (Mowen et al., 2018; Orjatsalo et al., 2025). This adaptation is considered relevant because trading entities do not incur production-process costs in the same manner as manufacturing entities and therefore do not generally apply manufacturing overhead costing.

The wholesale industry for machinery and spare parts has unique characteristics. The high value per unit of inventory, relatively long inventory turnover cycles, and dependence on global supply chains make companies more vulnerable to external factors. Huo et al. (2024) affirm that supply chain resilience positively affects customer satisfaction and financial performance. Meanwhile, Patel (2023) underscores the importance of supplier diversification, inventory management, and demand forecasting as key elements of resilience. Krajewski et al. (2021) and Petropoulos et al. (2026) reveal that companies require inventory reserves to anticipate stockouts caused by demand fluctuations and inventory lead times. The availability of sufficient safety stock is a determining factor in supporting repeat-order activities and preventing stockouts. Dybskaya & Sverchkov (2017) and Azim et al. (2022) add the dimension of rational distribution network design as a determinant of logistics cost efficiency.

Although numerous studies have discussed AIS in relation to inventory management and selling price determination methods separately, they are generally limited to single-company case studies. Other research remains limited in terms of studies that integrate AIS-based inventory cycle analysis with variable costing logic in comparable public companies and examine these relationships comparatively over several years. Furthermore, inventory turnover, turnover speed, and inventory holding duration may influence the magnitude of the markup used in selling price determination, but this relationship has not been extensively tested empirically across companies within this industry. This research is motivated by the need to fill this gap by analyzing five wholesale trading companies in the machinery and spare parts sector listed on the IDX, namely UNTR, HEXA, KOBX, INTA, and AKRA, over a four-year period from 2022 to 2025, with all figures standardized in millions of rupiah, under the research title: "Analysis of Accounting Information Systems in the Inventory Cycle and Selling Price Determination Using the Variable Costing Approach: A Case Study of Wholesale Trading Companies of Machinery, Spare Parts, and Accessories Listed on the Indonesia Stock Exchange."

Based on the above description, this study aims to describe AIS practices in the inventory

cycle based on inventory valuation methods and disclosures; analyze inventory cycle efficiency through inventory turnover and inventory age from 2022 to 2025; and examine the relationship between inventory cost information and selling price determination through the variable costing approach and implicit cost-plus markup, including the phenomenon of the influence of inventory turnover on markup setting.

METHOD

This study employed a descriptive quantitative approach with a comparative design, grounded in the interpretive framework of variable costing theory and inventory management efficiency principles. The comparative design was selected to enable systematic cross-company and inter-period analysis, facilitating the identification of inventory management patterns and their influence on pricing decisions. This methodological approach was particularly suitable for examining phenomena in mature markets where standardized financial reporting enables reliable comparisons across similar entities (Atsalakis et al., 2026; Garrison et al., 2021).

The data used in this study were secondary data in the form of audited consolidated financial statements and notes to the financial statements published through the IDX and the companies' official websites. Data were collected through documentation, namely by examining the statements of financial position, income statements, and inventory notes to obtain information on revenue, cost of goods sold, gross profit, and the value and details of inventory.

To maintain consistency and comparability among companies, all financial items in this study were standardized in units of millions of rupiah. This standardization was considered important because the companies used different reporting units. UNTR and INTA presented figures in millions of rupiah, AKRA presented figures in thousands of rupiah (which were divided by 1,000), KOBX presented figures in rupiah (which were divided by 1,000,000), while HEXA presented figures in U.S. dollars (USD). Figures presented in HEXA's financial statements were converted into rupiah using the closing exchange rate per U.S. dollar (USD) published by Bank Indonesia, as disclosed in its financial statements, namely Rp14,348.42 as of March 31, 2022; Rp15,062.31 as of March 31, 2023; Rp15,853.62 as of March 31, 2024; and Rp16,587.43 as of March 31, 2025. The converted figures were then stated in millions of rupiah.

It should be emphasized that HEXA used a fiscal year ending on March 31. In the context of this study, the year indicated as 20XX for HEXA referred to the fiscal year ending March 31, 20XX; thus, "2022" referred to the fiscal year ending March 31, 2022, and so forth through "2025," which referred to the fiscal year ending March 31, 2025. This convention was adopted so that the four year-points for HEXA could be easily traced to the audited financial statements and the exchange rates disclosed therein, thereby maintaining consistency and verifiability in making comparisons.

The data analysis techniques included qualitative analysis of inventory AIS disclosures, including valuation methods, impairment provisions, and types of inventory, as well as quantitative analysis through ratio calculations. The ratios calculated were as follows:

1) Inventory Turnover (ITO). This ratio measures how many times inventory turns over during a year.

$$\text{ITO} = \text{Cost of Goods Sold} \div \text{Average Inventory}$$

2) Days Inventory Outstanding (DIO). This ratio measures the average number of days inventory is held before being sold.
3)

$$\text{DIO} = 365 \div \text{ITO}$$

4) Gross Profit Margin (GPM). This ratio was used as an indicator of the margin generated from merchandise sales under the variable costing logic adapted for trading companies.

$$\text{GPM} = \text{Gross Profit} \div \text{Revenue}$$

5) Implicit Markup (Cost-Plus). This ratio indicates the percentage added to the cost of merchandise in determining the selling price.

Cost-Plus Markup = Gross Profit ÷ Cost of Goods Sold

The calculation results were then interpreted and compared across companies and periods to draw conclusions regarding inventory cycle efficiency and its influence on selling price determination, including an analysis of the relationship between inventory turnover and markup magnitude.

RESULTS AND DISCUSSION

Inventory Accounting Information System Practices

The results of the analysis of inventory notes from the five sample companies show uniformity in principles, as well as technical differences in inventory valuation. Overall, the companies disclose inventory at the lower of cost and net realizable value, in accordance with PSAK 14. The differences among companies lie in the cost determination method, as summarized in Table 1.

Table 1

Inventory Valuation Methods and Main Inventory Types

Company	Cost Determination Method	Main Inventory Types
UNTR	Specific identification for heavy equipment units and work in process; moving average for spare parts, raw materials, and auxiliary materials	Spare parts, heavy equipment, minerals (coal, gold, nickel), auxiliary materials
HEXA	Specific identification for heavy equipment; average method for spare parts	Spare parts, heavy equipment, work in process, goods in transit
KOBX	Specific identification for finished goods (heavy equipment units); FIFO for spare parts	Heavy equipment units & spare parts (Doosan, Mercedes-Benz, Jungheinrich, Dynapac, NHL Terex, Hako brands)
INTA	Weighted average	Spare parts, heavy equipment, work in process, raw materials (trading & manufacturing segments)
AKRA	FIFO, except for certain chemical products using weighted average	Finished goods, raw materials, packaging materials, spare parts and others

Source: Notes to the financial statements of each company, processed (2025)

Table 1 shows a pattern that is consistent with product characteristics. For heavy equipment units that have high values and can be individually identified, the four heavy equipment companies (UNTR, HEXA, KOBX, and INTA) tend to use the specific identification method, except for INTA, which adopts the weighted-average method. For homogeneous and high-volume spare parts, companies tend to use the average-cost or FIFO method. AKRA, which is engaged in chemical trading and distribution, applies the FIFO method, with a weighted-average method used as an exception for certain chemical products. The selection of these methods reflects efforts within the accounting information system (AIS) to present inventory values and cost of goods sold that are representative of the physical flow of goods.

All companies except AKRA establish allowances for inventory impairment or obsolescence. UNTR recorded an allowance of Rp573.9 billion in 2024, up from Rp450.2 billion in 2023; HEXA recorded an allowance for a decline in the market value of approximately US$4.06 million; INTA recorded Rp103.6 billion; and KOBX recorded Rp21.8 billion. AKRA stated that no allowance was required to be presented at the reporting date. The disclosure of these allowances indicates that AIS not only records inventory quantities but also evaluates the condition and recoverability of inventory values, which is an important function for maintaining the reliability of accounting information in accordance with the net realizable value principle under PSAK 14.

Inventory Cycle Analysis: Turnover and Inventory Age

To assess inventory cycle efficiency, Table 2 presents the main financial figures, all of which have been standardized into millions of Rupiah. Table 3 presents the calculated ratios. The

standardization of units in Table 2 facilitates direct comparison of the business scale among companies, while efficiency comparisons are reinforced through the ratios in Table 3.

Table 2
Revenue, Cost of Goods Sold, Gross Profit, and Net Inventory, 2022–2025 (in millions of Rupiah)

Company	Year	Revenue	Cost of Goods Sold	Gross Profit	Net Inventory
UNTR	2022	123,607,460	88,848,772	34,758,688	15,390,277
	2023	128,583,264	92,797,027	35,786,237	17,184,208
	2024	134,426,998	100,595,438	33,831,560	16,993,549
	2025	131,300,810	101,597,306	29,703,504	16,729,809
HEXA	2022	6,647,087	4,976,917	1,670,170	1,910,745
	2023	9,496,714	7,614,448	1,882,266	3,292,319
	2024	9,707,587	7,513,788	2,193,799	3,216,312
	2025	8,670,496	6,840,892	1,829,604	3,514,099
KOBX	2022	2,506,023	2,051,712	454,311	804,568
	2023	1,962,284	1,638,161	324,123	1,604,667
	2024	2,101,582	1,717,959	383,623	1,402,692
	2025	1,675,483	1,427,626	247,857	1,246,811
INTA	2022	661,309	563,033	98,276	158,400
	2023	1,081,792	852,898	228,894	269,399
	2024	954,679	753,981	200,698	254,604
	2025	966,917	781,360	185,557	276,795
AKRA	2022	47,539,987	43,287,573	4,252,414	3,051,343
	2023	42,086,952	37,613,488	4,473,464	3,133,622
	2024	38,729,493	35,220,457	3,509,036	3,462,764
	2025	46,018,468	41,920,479	4,097,989	2,601,112

Source: Audited financial statements of each company, processed. All figures in millions of Rupiah. HEXA figures converted from US Dollars using closing exchange rates as disclosed in the Research Method; AKRA units from thousands and KOBX from full Rupiah have been adjusted to millions of Rupiah.

Table 3
Inventory Efficiency Ratios and Implicit Mark-up, 2022–2025

Company	Year	GPM (%)	ITO (times)	DIO (days)	Mark-up (%)
UNTR	2022	28.12	5.77	63.2	39.12
	2023	27.83	5.40	67.6	38.56
	2024	25.17	5.92	61.7	33.63
	2025	22.62	6.07	60.1	29.24
HEXA	2022	25.13	2.60	140.1	33.56
	2023	19.82	2.31	157.8	24.72
	2024	22.60	2.34	156.2	29.20
	2025	21.10	1.95	187.5	26.75
KOBX	2022	18.13	2.55	143.1	22.14
	2023	16.52	1.02	357.5	19.79
	2024	18.25	1.22	298.0	22.33
	2025	14.79	1.15	318.8	17.36
INTA	2022	14.86	3.55	102.7	17.45
	2023	21.16	3.17	115.3	26.84
	2024	21.02	2.96	123.3	26.62
	2025	19.19	2.82	129.3	23.75
AKRA	2022	8.94	14.19	25.7	9.82
	2023	10.63	12.00	30.4	11.89
	2024	9.06	10.17	35.9	9.96
	2025	8.91	16.12	22.6	9.78

Table 3 reveals a clear and consistent diversity of business models throughout 2022–2025. AKRA recorded the highest inventory turnover, ranging from 10.17 to 16.12 times, with a peak of 16.12 times in 2025 and an inventory age of only 22.6 days. However, its gross profit margin tends to be modest, ranging from 8.91% to 10.63%, accompanied by the lowest implicit *mark-up*, ranging from 9.78% to 11.89%. This pattern reflects a high-volume, low-margin strategy that is typical of commodity distribution, such as fuel and chemicals. Faster inventory turnover is therefore a primary source of profitability. Conversely, KOBX had the lowest inventory turnover of 1.02 times in 2023, with an inventory age reaching 357.5 days. Throughout the period, its inventory turnover ranged from 1.02 to 2.55 times. This can be considered reasonable given that high-value heavy equipment units generally require a longer selling period. Thus, the margin per unit is generally set higher to compensate for storage costs and the longer period for which capital remains tied up in inventory.

UNTR occupies a balanced position, with inventory turnover ranging from 5.40 to 6.07 times. This is supported by its diversified business lines, covering construction machinery, mining contracting, and commodities. However, UNTR's gross profit margin declined from 28.12% in 2022 to 22.62% in 2025. This indicates a sustained decline in margins, potentially resulting from commodity price pressures and other costs. HEXA is in the middle range, with inventory turnover ranging from 1.95 to 2.60 times and gross profit margins between 19.82% and 25.13%. Meanwhile, INTA showed a margin recovery from 14.86% in 2022 to approximately 21% in 2023–2024 before declining to 19.19% in 2025. These differences in inventory turnover can partly be explained by the relative proportions of spare parts and heavy equipment units in inventory, as spare parts generally have a faster turnover rate than heavy equipment units.

In terms of interperiod trends, the majority of companies experienced weakening gross profit margins toward 2025. UNTR's margin declined gradually throughout the four years, AKRA fluctuated around 9%, reaching its lowest point of 8.91% in 2025, and KOBX, after increasing to 18.25% in 2024, declined significantly to 14.79% in 2025. These changes coincided with declining revenue in several companies and indicate a significant influence of pricing and cost pressures toward the end of the observation period. This pattern further underscores the importance of accurate inventory cost information as a basis for selling price adjustments.

Discussion

The Phenomenon of the Influence of Inventory Turnover on Selling Price Determination

The analysis of the 2022–2025 panel data reveals a consistent observational pattern regarding the relationship between inventory turnover and the magnitude of the *mark-up* used to determine selling prices. While this relationship demonstrates clear empirical consistency across the sample, it should be noted that these findings are based on descriptive comparative analysis rather than inferential statistical testing. This observational pattern provides a basis for identifying differences in business models and offers insights for management practice, although formal hypothesis testing would require additional statistical methodologies, as discussed in the limitations section.

AKRA, which has the fastest inventory turnover (ITO of 10.17–16.12 times; DIO of 22.6–35.9 days), consistently applies the lowest *mark-up*, ranging from 9.78% to 11.89%. Conversely, KOBX, which has the slowest inventory turnover (ITO of 1.02–2.55 times; DIO of 143.1–357.5 days), applies a relatively higher *mark-up*, although its *mark-up* remains lower than those of UNTR and HEXA in the earlier years. HEXA recorded a DIO of 187.5 days in 2025 and a *mark-up* of 26.75%. In the context of *variable costing*, this pattern can be explained by the fact that companies with faster inventory turnover can distribute fixed costs across a larger number of transactions, reducing the fixed-cost burden per unit and allowing selling prices to be set more competitively. Conversely, when inventory turnover is slow, each unit may need to generate a higher contribution margin to help cover fixed operating costs, inventory holding costs, obsolescence risk, and the opportunity cost of capital tied up in unsold inventory.

UNTR's declining gross profit margin and *mark-up*, from 39.12% in 2022 to 29.24% in 2025, together with an increase in inventory turnover from 5.77 to 6.07 times, suggest that inventory turnover is influenced by competitive pressure, which may encourage companies to reduce *mark-ups* to maintain price competitiveness. Similarly, AKRA's performance in 2025 shows the same pattern, with inventory turnover increasing to 16.12 times, the shortest DIO at

22.6 days, and the lowest *mark-up* at 9.78%. This indicates a strategy of turning inventory over as quickly as possible while maintaining relatively low margins. However, when turnover dropped drastically, as reflected by KOBX's DIO of 357.5 days in 2023, the decline was not immediately followed by an increase in *mark-up*. Instead, the *mark-up* fell to 19.79%, which may reflect declining demand and the need to maintain price competitiveness. Thus, when inventory turnover slows because of weak market demand, companies cannot necessarily raise prices and may instead need to reduce or maintain margins to accelerate inventory liquidation.

Therefore, the phenomenon of inventory turnover carries significant practical implications for operations and financial management. The findings demonstrate that selling price decisions should consider the accuracy of AIS information regarding inventory turnover and holding periods. Reliable inventory data generated by AIS enables management to evaluate Days Inventory Outstanding (DIO) and dynamically adjust *mark-up* strategies in response to changing market conditions. Furthermore, inventory turnover serves as a critical operational indicator connecting warehouse and logistics efficiency with pricing policies, allowing companies to employ tactical strategies such as accelerating the disposal of slow-moving inventory through margin adjustments or maintaining premium pricing for fast-moving items with higher sales velocity. This integration of inventory management and pricing strategy demonstrates that variable-cost-based pricing in trading companies is inherently dynamic and sensitive to inventory behavior patterns. Such insights are particularly valuable for the wholesale machinery industry, where inventory holding costs can significantly affect profitability.

Selling Price Determination Using the Variable Costing Approach

In trading companies, the cost of merchandise acquisition is closely related to sales volume. Thus, in the context of *variable costing*, cost of goods sold may constitute a major component of variable costs. The difference between sales revenue and total variable costs represents the contribution margin, which is available to cover fixed costs incurred during the period, such as selling and administrative expenses, depreciation, and other fixed operating costs, and to generate profit. Accordingly, the implicit *mark-up* ratio in Table 3 represents the percentage added above the variable cost of merchandise, which is consistent with the principle of *cost-plus* pricing based on variable costs (Atsalakis et al., 2026; Garrison et al., 2021; Horngren et al., 2022).

The results show that the implicit *mark-up* varies from 9.78% AKRA P. T. A. K. R. C. Tbk, (2025) to 39.12% UNTR P. T. U. T. Tbk, (2022). These results are consistent with the differences in turnover speed discussed in the inventory turnover phenomenon, whereby companies with high inventory turnover, such as AKRA, may be able to operate with a lower *mark-up* because profitability is supported by sales volume. Meanwhile, companies with slower inventory turnover, such as KOBX and HEXA, tend to apply higher *mark-ups* to compensate for inventory-related costs, including *holding costs*. This is consistent with the observations of Prayogi et al. (2025) and Ratnasih and Sulbahri (2022), which indicate that volume and cost structure directly influence pricing; namely, higher sales volume can reduce fixed cost per unit, allowing selling prices to be set more competitively.

An important implication of this approach is that appropriate selling price determination depends heavily on the accuracy of inventory cost information generated by AIS. If the cost per unit is not recorded accurately, for example, because of inconsistent valuation methods or delayed recognition of impairment, the estimated contribution margin may become inaccurate, and selling prices may consequently be set too high or too low. This highlights the importance of the relationship between inventory AIS quality, *variable costing* calculations, and selling price determination, which is the focus of this study.

Supply chain resilience emerges as a critical contextual factor influencing inventory cycle efficiency and pricing flexibility in the wholesale machinery sector. Huo et al. (2024) demonstrate that supply chain resilience positively impacts customer satisfaction and financial performance through improved operational reliability. For heavy equipment distributors such as KOBX and HEXA, which depend on global principal brands and international supply networks, supply chain disruptions can substantially extend inventory age, increase holding costs, and reduce pricing flexibility. This necessitates proactive inventory management through improvements in distribution network design and logistics planning Anansyah et al. (2024) and Dybskaya and

Sverchkov (2017), complemented by robust material-handling practices Kusmiwardhana and Sugiono (2020). These supply chain considerations reinforce the importance of maintaining accurate and timely AIS data for dynamic inventory and pricing management.

CONCLUSION

This study concludes that accounting information systems (AIS) support inventory management and selling price determination by providing reliable inventory valuation and cost information. Across the five companies, inventory cycle efficiency varied according to business characteristics, with AKRA recording the highest inventory turnover of 16.12 times in 2025 and KOBX the lowest at 1.02 times in 2023. The findings also show an observable inverse pattern between inventory turnover and implicit *mark-up*, indicating that inventory turnover information can be a relevant consideration in variable-cost-based pricing decisions. The scientific contribution of this study lies in integrating inventory AIS practices, inventory cycle efficiency, and variable-cost-based selling price determination within a multi-company and multi-year framework, thereby extending the application of AIS information from inventory recording to managerial pricing decisions.

This study is limited by the use of aggregate secondary financial data, which restricts the ability to identify product-level costs and distinguish fixed and variable costs in greater detail. In addition, the observed relationship between inventory turnover and *mark-up* is descriptive and cannot be interpreted as a statistically established causal relationship because inferential statistical testing was not performed. Future research should therefore use more granular internal company data, examine product-level variable costing and *cost-plus pricing*, apply inferential statistical methods to test the relationship between inventory turnover and *mark-up*, and expand the sample across industries and longer observation periods. These approaches would strengthen the empirical evidence regarding the role of AIS in integrating inventory management and pricing decisions.

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AUTHOR CONTRIBUTION STATEMENT

The authors jointly contributed to the conceptualization, methodology, data collection, data analysis, interpretation of results, and preparation and revision of the manuscript. All authors reviewed and approved the final version of the manuscript.

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