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Early Effects of the Serious Accidents Punishment Act on Occupational Health Outcomes in Korea: A Nationwide Difference-in-Differences Study (2017–2023)

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ABSTRACT

Background: Work-related injury and occupational disease remain major public health challenges worldwide; South Korea continues to report comparatively high industrial accident rates among OECD countries. To strengthen managerial accountability for worker safety, the Korean government enacted the Serious Accidents Punishment Act (SAPA) in 2021, effective January 2022. The Act institutionalizes corporate responsibility for occupational safety through compliance-based governance. SAPA was implemented in phases, initially covering enterprises with ≥ 50 employees and construction projects exceeding 5 billion KRW. This selective enforcement created a quasi-experimental setting to evaluate early effects. We assessed differences in short-term patterns of occupational injury, disease, and fatality rates between enterprises covered and not covered by SAPA during its initial enforcement phase.

Methods: We analyzed nationwide industrial accident statistics for 2017–2023 using a difference-in-differences (DID) design. Injury, disease, and fatality rates were stratified by enterprise size and industry to compare outcomes between enterprises covered and not covered by the law.

Results: From 2017 to 2023, occupational injuries and diseases increased, whereas fatalities declined slightly. DID estimates showed no statistically significant nationwide reductions in injuries or fatalities after SAPA enforcement began. However, disease rates declined significantly in construction ($\beta = -0.067$; $p < 0.015$), suggesting differentiated effects across industries.

Conclusions: During the limited enforcement phase (2022–2023), SAPA did not immediately reduce nationwide accidents but showed early improvements in disease prevention in high-risk sectors such as construction. Although immediate effects were limited, continued monitoring and expanded coverage are essential to evaluate long-term impacts on worker health and safety. Findings underscore the need for integrated policies that couple legal accountability with preventive safety capacity-building.

1 | Introduction

Work-related injuries and occupational diseases remain critical challenges for worker health and safety globally. Despite long-standing regulatory frameworks such as the Occupational Safety and Health Act (enacted in 1981), Korea continues to

report comparatively high rates among OECD countries of industrial accidents and fatalities [1, 2]. To strengthen corporate accountability for worker safety, the Korean government enacted the Serious Accidents Punishment Act (SAPA) in 2021, effective January 2022 [3]. The law seeks to establish

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managerial responsibility for occupational safety and prevent serious accidents through compliance-based safety governance.

SAPA's implementation was phased rather than universal. In its initial stage, the law applied to businesses with ≥ 50 regular workers and to construction projects exceeding 5 billion KRW (US\$3.5 million) in contract value [4]. Small enterprises—which account for most occupational accidents in Korea—remained outside its scope until workplaces with ≥ 5 employees were included in January 2024. This partial enforcement reflects regulatory pragmatism and capacity constraints, and it creates an opportunity to begin to test differential impacts between covered and uncovered enterprises.

Although studies have examined SAPA effects [5], evidence stratified by enterprise size and industry remains limited. Because safety conditions and compliance capacity vary by enterprise size and industry, early evaluation of the selective enforcement phase is crucial [6, 7]. Analyzing sectoral responses to stricter legal accountability can clarify how legislation influences occupational health outcomes and safety culture.

We evaluated SAPA's early effects on short-term patterns of injury, disease, and fatality rates across Korean industries, contrasting enterprises subject to versus exempt from the law during the initial enforcement period. Using national compensation records from 2017 to 2023 and a difference-in-differences (DID) analytical design, we assessed how accountability reforms translate into measurable changes in worker health and safety at the national level.

2 | Methods

2.1 | Study Design and Data Sources

We used a DID design to evaluate early SAPA effects on injury, disease, and fatality rates in South Korea. DID compares pre- and post-policy changes between affected and unaffected enterprises, estimating the average treatment effect while accounting for time-invariant confounders. We used national industrial accident statistics from the Occupational Safety and Health Research Institute (OSHRI) and the Korea Workers' Compensation and Welfare Service (KCOMWEL). These data constitute the official national record of injuries, diseases, and fatalities across insured enterprises and are publicly available via the OSHRI Open Statistics Portal (<https://oshri.kosha.or.kr/english/index.do>) for 2017–2023. We defined pre-implementation (2017–2021) and post-implementation (2022–2023) periods corresponding to SAPA's commencing enforcement in January 2022.

2.2 | Study Population and Grouping

Enterprises were categorized into two groups based on SAPA's statutory scope:

1. Treatment group—enterprises with ≥ 50 full-time employees or construction projects with contract values ≥ 5 billion KRW, to which SAPA applied beginning in 2022.
2. Control group—enterprises with < 50 employees, to which the Act did not apply during the study period.

Industry classifications followed the International Standard Industrial Classification to enable sector-stratified analyses (e.g., manufacturing, construction, transportation).

2.3 | Outcome Variables

We analyzed four occupational health and safety outcomes, defined according to international standards from the International Labour Organization (ILO, 16th ICLS) [8] and the U.S. Bureau of Labor Statistics (<https://www.bls.gov/iif/definitions/occupational-safety-and-health-definitions.htm>). Occupational injury and disease rates were calculated as the number of compensated cases divided by the total number of workers and multiplied by 100. The work-related fatality rate was calculated as the number of deaths divided by the total number of workers and multiplied by 10,000.

1. Occupational injury and disease rate:

Total number of compensated cases involving either injury or disease requiring medical treatment. This combined indicator measures the burden of work-related harm, encompassing acute and chronic conditions.

2. Occupational disease rate:

Number of recognized cases attributable to prolonged or repeated exposure to work-related risk factors, including pneumoconiosis, noise-induced hearing loss, metal and heavy metal exposure, organic compound exposure, other chemical exposures, cerebrovascular and cardiovascular disease, and work-related musculoskeletal conditions such as physical strain and low back pain, capturing nonaccidental, exposure-related illnesses consistent with ILO and OSHRI definitions. Although occupational diseases are often associated with prolonged or cumulative exposures, the disease category in this study includes both long-latency conditions such as pneumoconiosis and noise-induced hearing loss, and shorter-latency conditions such as work-related musculoskeletal disorders.

3. Occupational injury rate:

Number of cases of acute physical harm resulting from a single work-related injurious event, including falls (from height), slips and trips, being struck against or by objects, collapse, being caught in or between objects, cuts, lacerations, and punctures, electric shock, explosion or rupture, fire, being crushed or overturned, contact with extreme temperatures, drowning or submersion, mining accidents, overexertion or awkward movements, exposure to or contact with chemicals, oxygen deficiency, traffic accidents within or outside the workplace, accidents during sports or recreational activities, violence, animal-related injuries, and other causes, that required medical attention; corresponds to the “occupational injury” category in ILO and BLS frameworks.

4. Work-related fatality rate:

Number of deaths from occupational injuries or exposures officially recognized by KCOMWEL; consistent with international conventions for fatal occupational injury statistics.

These definitions support cross-national comparison and comply with reporting guidance from ILOSTAT and GRI 403: Occupational Health and Safety (<https://ilostat.ilo.org/methods/concepts-and-definitions/description-occupational-safety-and-health-statistics/>).

2.4 | Statistical Analysis

Statistical analyses were conducted in three stages. First, descriptive analyses summarized annual counts (N) and corresponding rates of occupational injury and disease combined, occupational injury, occupational disease, and work-related fatalities from 2017 to 2023. Results were stratified by enterprise size (total, < 50 employees, and ≥ 50 employees).

Second, to assess temporal trends prior to policy evaluation, linear regression models were fitted with the annual outcome rate as the dependent variable and calendar year as the independent variable. Subgroup analyses were conducted according to enterprise size (< 50 employees and ≥ 50 employees). Industry classification was included as a categorical covariate. Regression coefficients and 95% confidence intervals were estimated for each model.

Finally, the DID model was specified as:

$$Y_{it} = \beta_0 + \beta_1 \text{Post}_t + \beta_2 \text{Treatment}_i + \beta_3 (\text{Post}_t \times \text{Treatment}_i) + \sum_k \gamma_k X_{ikt} + \varepsilon_{it}$$

where Y_{it} denotes the outcome for enterprise i in year t ; Post_t indicates the post-enforcement period (2022–2023), and Treatment_i identifies enterprises under SAPA enforcement. The coefficient β_3 estimates the average treatment effect of SAPA. Covariates X_{ikt} included industry classification to control for structural heterogeneity [9]. In addition to the overall model, industry-stratified DID analyses were conducted to explore potential heterogeneity across sectors. Analyses were conducted in SAS 9.4 (SAS Institute Inc., Cary, NC, USA). Robust standard errors addressed heteroskedasticity and clustering within enterprise strata. Parallel trends were assessed using pre-policy data (2017–2021) to evaluate DID validity [10].

3 | Results

From 2017 to 2023, national industrial accident statistics from OSHRI showed a steady increase in overall occupational injury and disease rates among Korean workers. As reported in Table 1 and Figure 1, the total occupational injury and disease rate rose from 0.48% in 2017 to 0.66% in 2023, with a steeper increase for occupational diseases, which nearly doubled from 0.05% to 0.11%. The work-related fatality rate fluctuated slightly but declined after 2022, decreasing from 1.10 to 0.98 deaths per 10,000 workers in 2023.

By enterprise size, Table 1 and Figure 1 further show that small workplaces (< 50 employees) consistently reported higher rates across all outcomes throughout the study period. In 2023, the occupational injury and disease rate among small enterprises

was 0.77%, approximately 1.5 times that of enterprises with ≥ 50 employees (0.50%). Although the work-related fatality rate decreased marginally in both size groups after SAPA enforcement in 2022, smaller enterprises maintained proportionally higher mortality rates.

Linear regression results summarized in Table 2 indicated an overall upward trajectory of occupational injuries and diseases over time. The trend was statistically significant among small enterprises, whereas the slope for larger enterprises remained modest and not significant after SAPA's introduction. For enterprises covered by SAPA, the estimated post-implementation change in total occupational injury and disease rates was small ($\beta = 0.008$, 95% CI: -0.039 to 1.613).

The DID estimates are presented in Table 3 and visualized in Figure 2. The analysis comparing enterprises with ≥ 50 and < 50 employees found no statistically significant nationwide effect attributable to SAPA enforcement. Specifically, the effects for total occupational injuries and diseases ($\beta = 2.676$, $p = 0.403$), occupational injury ($\beta = 0.074$, $p = 0.535$), and work-related fatalities ($\beta = 4.996$, $p = 0.924$) were all not significant. However, a significant decrease in occupational disease rates was detected within the construction industry ($\beta = -0.067$, $p = 0.015$; Table 3). During SAPA's limited enforcement period (2022–2023), when only enterprises with ≥ 50 employees were subject to the law, no significant nationwide reduction in occupational accidents or fatalities was observed, though evidence of improved disease prevention emerged in high-risk sectors such as construction.

4 | Discussion

We evaluated the early impact of SAPA on occupational injury, disease, and fatality outcomes in South Korea using national data from 2017 to 2023. During the limited enforcement period (2022–2023), when only enterprises with ≥ 50 employees were covered, overall rates of occupational injuries, diseases, and fatalities did not decline significantly. By contrast, the construction industry showed a significant reduction in occupational disease rates following SAPA enforcement. These findings underscore the incremental nature of policy effects and the importance of contextual factors, including industry-specific hazards, regulatory enforcement, and enterprise size.

Over the study period, the steady increase in reported occupational injuries and diseases likely reflects multiple, overlapping influences rather than a simple deterioration in workplace safety. First, demographic and labor market changes, including aging of the workforce and expansion of employment in high-risk sectors, may have gradually elevated susceptibility to both acute injuries and chronic conditions [11]. Second, improvements in coverage of workers' compensation, recognition criteria for occupational diseases, and awareness of claim procedures could have increased the likelihood that cases are reported and officially compensated [12]. Finally, enhanced surveillance and policy attention to occupational health may have strengthened reporting incentives among employers, particularly in sectors under closer regulatory scrutiny [13, 14].

TABLE 1 | Trends in occupational injury, disease, and fatality by enterprise size, 2017–2023.

Indicator	2017	2018	2019	2020	2021	2022	2023
Total workers, <i>n</i>	18,560,142	19,074,438	18,725,160	18,974,513	19,320,447	20,173,615	20,637,107
Occupational injury and disease, <i>n</i>	89,848	102,305	109,242	109,079	122,721	130,348	136,796
Occupational injury and disease rate, %	0.4841	0.5363	0.5834	0.5749	0.6352	0.6461	0.6629
Occupational disease, <i>n</i>	9183	11,473	15,195	15,996	20,435	23,134	23,331
Occupational disease rate, %	0.0495	0.0601	0.0811	0.0843	0.1058	0.1147	0.1131
Occupational injury, <i>n</i>	80,665	90,832	94,047	93,083	102,286	107,214	113,465
Occupational injury rate, %	0.4346	0.4762	0.5022	0.4906	0.5294	0.5315	0.5498
Work-related deaths, <i>n</i>	1957	2142	2020	2062	2080	2223	2016
Work-related fatality rate, per 10,000 workers	1.0544	1.1230	1.0788	1.0867	1.0766	1.1019	0.9769
Workers in small enterprises (< 50 employees), <i>n</i>	10,883,717	11,337,462	11,163,526	11,278,859	11,596,455	12,062,511	12,306,759
Occupational injury and disease, <i>n</i>	72,526	80,122	83,678	81,610	89,176	91,122	94,994
Occupational injury and disease rate, %	0.6664	0.7067	0.7496	0.7236	0.7690	0.7554	0.7719
Occupational disease, <i>n</i>	4891	6013	8087	8227	10,460	11,334	12,352
Occupational disease rate, %	0.0449	0.0530	0.0724	0.0729	0.0902	0.0940	0.1004
Occupational injury, <i>n</i>	67,635	74,109	75,591	73,383	78,716	79,788	82,642
Occupational injury rate, %	0.6214	0.6537	0.6771	0.6506	0.6788	0.6615	0.6715
Work-related deaths, <i>n</i>	1148	1285	1245	1303	1359	1372	1241
Work-related fatality rate, per 10,000 workers	1.0548	1.1334	1.1152	1.1553	1.1719	1.1374	1.0084
Workers in medium- and large enterprises (≥ 50 employees), <i>n</i>	7,676,425	7,736,976	7,561,634	7,695,654	7,723,992	8,111,104	8,330,348
Occupational injury and disease, <i>n</i>	17,322	22,183	25,564	27,469	33,545	39,226	41,802
Occupational injury and disease rate, %	0.2257	0.2867	0.3381	0.3569	0.4343	0.4836	0.5018
Occupational disease, <i>n</i>	4292	5460	7108	7769	9975	11,800	10,979
Occupational disease rate, %	0.0559	0.0706	0.0940	0.1010	0.1291	0.1455	0.1318
Occupational injury, <i>n</i>	13,030	16,723	18,456	19,700	23,570	27,426	30,823
Occupational injury rate, %	0.1697	0.2161	0.2441	0.2560	0.3052	0.3381	0.3700
Work-related deaths, <i>n</i>	809	857	775	759	721	851	775
Work-related fatality rate, per 10,000 workers	1.0539	1.1077	1.0249	0.9863	0.9335	1.0492	0.9303

While these mechanisms cannot be formally tested with the available data, they align with existing knowledge on occupational reporting and risk and provide a useful context for understanding the upward trends in national statistics.

The lack of an immediate nationwide decline in occupational incidents accords with international experience: newly implemented legal regimes often require several years before measurable workplace safety gains emerge. Early effects tend to elevate compliance awareness and institutional accountability rather than produce direct outcome changes [15, 16]. Korea's introduction of criminal liability for work-related deaths marks a paradigm shift, but its deterrent effect hinges on administrative readiness and managerial adaptation [3]. Large enterprises that already had established safety systems likely showed limited marginal gains, whereas smaller enterprises remained outside SAPA's legal scope during this period [7]. Most firms

also needed time to interpret the new obligations and allocate compliance resources [17, 18].

The observed reduction in occupational disease rates in the construction industry should be interpreted cautiously in light of disease heterogeneity. While some occupational diseases involve long latency periods and cumulative exposure, others, such as work-related musculoskeletal disorders, may respond more rapidly to changes in workplace practices, reporting, or regulatory compliance. Therefore, short-term changes following SAPA implementation may reflect early shifts in reporting or compliance rather than immediate reductions in long-latency disease incidence.

The construction industry exhibited a significant post-law reduction in occupational disease rates, consistent with recent reports that identify enhanced dust control, noise

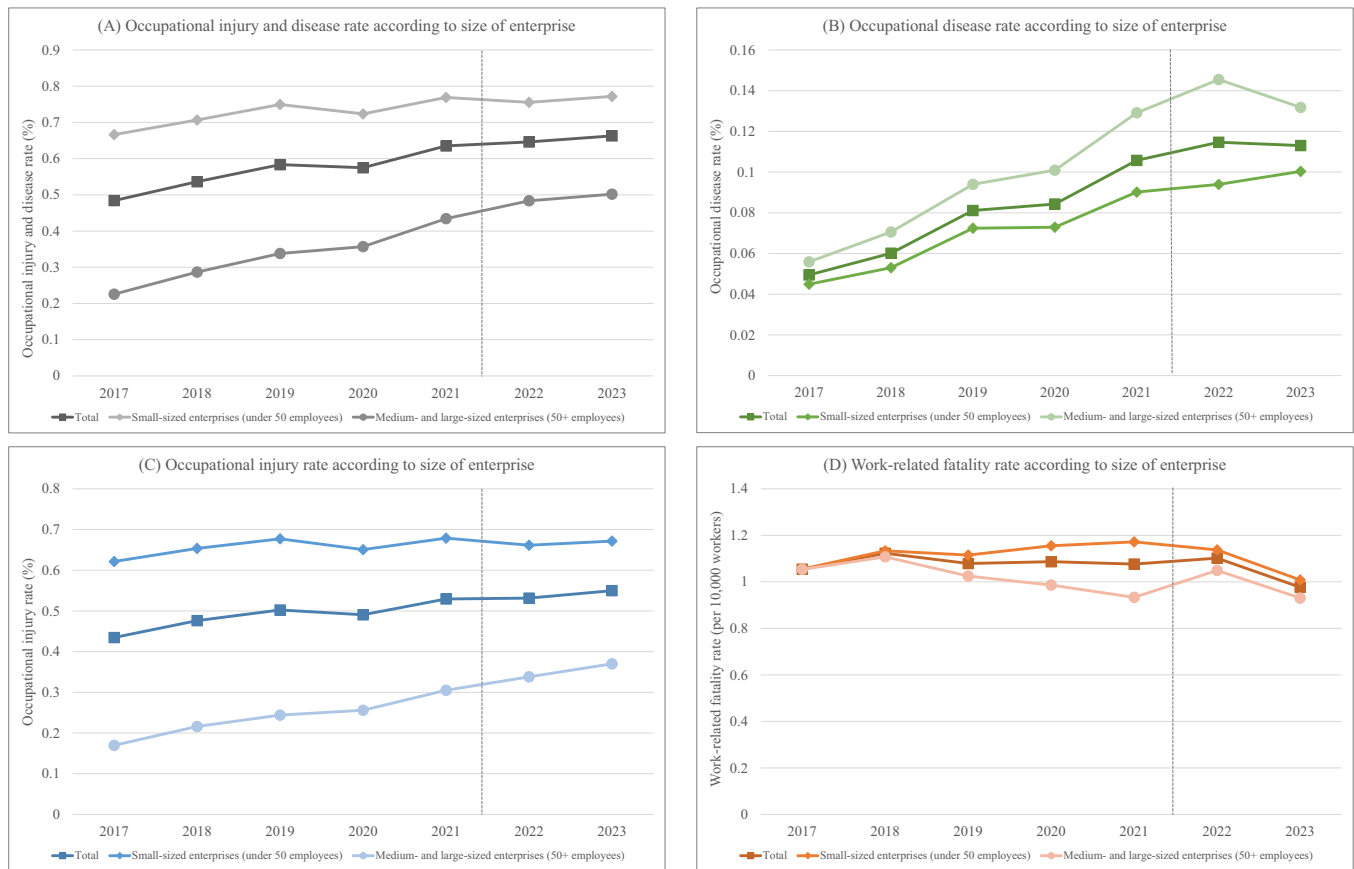


FIGURE 1 | Short-term changes in occupational injury, disease, and fatality rates before and after implementation of the Serious Accidents Punishment Act, by enterprise size. (A) Occupational injury and disease rate according to size of enterprise. (B) Occupational disease rate according to size of enterprise. (C) Occupational injury rate according to size of enterprise. (D) Work-related fatality rate according to size of enterprise. Lines indicate total, small-sized enterprises (<50 employees), and medium and large-sized enterprises (≥50 employees). [Color figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com)]

TABLE 2 | Linear regression estimates of temporal trends in occupational injury, disease, and fatality rates (2017–2023) by enterprise size.

	Estimate ^a (95% confidence interval)		
	Total workers	Small enterprises	Medium and large enterprises
Occupational injury and disease	0.482 (−0.076 to 1.040)	0.101 (0.008–0.194)	0.787 (−0.039 to 1.613)
Occupational disease	0.477 (−0.081 to 1.036)	0.100 (0.1017–0.183)	0.779 (−0.042 to 1.600)
Occupational injury	0.005 (−0.021 to 0.031)	0.000 (−0.044 to 0.044)	0.008 (−0.007 to 0.023)
Work-related fatality	−2.323 (−11.469 to 6.826)	0.093 (−1.351 to 1.538)	−4.254 (−17.946 to 9.439)

Note: Bold values indicate statistically significant.

^aAdjusted for industry classification.

reduction, and ergonomic hazard management as key drivers [18, 19]. Similar patterns have been noted in process-industry analyses, indicating that focused government inspection and investment in safety resources accelerate chronic disease prevention more than accident reduction [20]. This pattern may suggest that enforcement-linked interventions—such as mandatory safety-officer appointments and digital monitoring—may yield early gains in health outcomes rather than accident metrics [21].

This difference may reflect the distinct responsiveness of occupational disease and injury outcomes to regulatory and workplace changes. Occupational diseases, particularly those

related to musculoskeletal strain or repeated exposure, may be more sensitive to early improvements in reporting, compliance, or preventive practices [22]. In contrast, occupational injuries often depend on acute events and may require longer-term structural or behavioral changes to show measurable reductions [22, 23].

The absence of similar patterns in other sectors, such as transportation, may reflect differences in baseline risk profiles, enforcement intensity, and sector-specific operational characteristics. These factors may influence both the implementation of safety measures and the detectability of short-term changes following SAPA enforcement [24, 25].

TABLE 3 | Difference-in-differences estimates of the Serious Accidents Punishment Act: comparison of enterprises with ≥ 50 versus < 50 employees by Statistics Korea industry classification.

	Estimate (p value)			
	Occupational injury and disease	Occupational disease	Occupational injury	Work-related fatality
Total	2.676 (0.403)	2.602 (0.412)	0.074 (0.535)	4.996 (0.924)
Mining and quarrying	26.195 (0.208)	NA	0.188 (0.595)	50.621 (0.886)
Manufacturing	0.143 (0.287)	0.010 (0.807)	0.133 (0.249)	−0.081 (0.660)
Electricity, gas, steam, and water supply	0.046 (0.365)	−0.002 (0.924)	0.048 (0.302)	−0.191 (0.830)
Construction	0.167 (0.581)	−0.067 (0.015)	0.234 (0.413)	−0.064 (0.910)
Transportation, storage, and communication	−0.444 (0.387)	0.004 (0.845)	−0.448 (0.367)	−0.624 (0.276)
Forestry	0.405 (0.522)	−0.003 (0.823)	0.408 (0.511)	0.628 (0.532)
Fishing	0.164 (0.510)	0.032 (0.185)	0.132 (0.577)	−0.432 (0.783)
Agriculture	0.062 (0.607)	0.017 (0.172)	0.045 (0.692)	−0.101 (0.789)
Financial and insurance activities	−0.020 (0.473)	0.005 (0.753)	−0.025 (0.130)	0.197 (0.420)
Other service activities	0.046 (0.406)	0.019 (0.076)	0.028 (0.588)	0.006 (0.922)

Note: NA, not estimable due to model nonconvergence. Bold values indicate statistically significant.

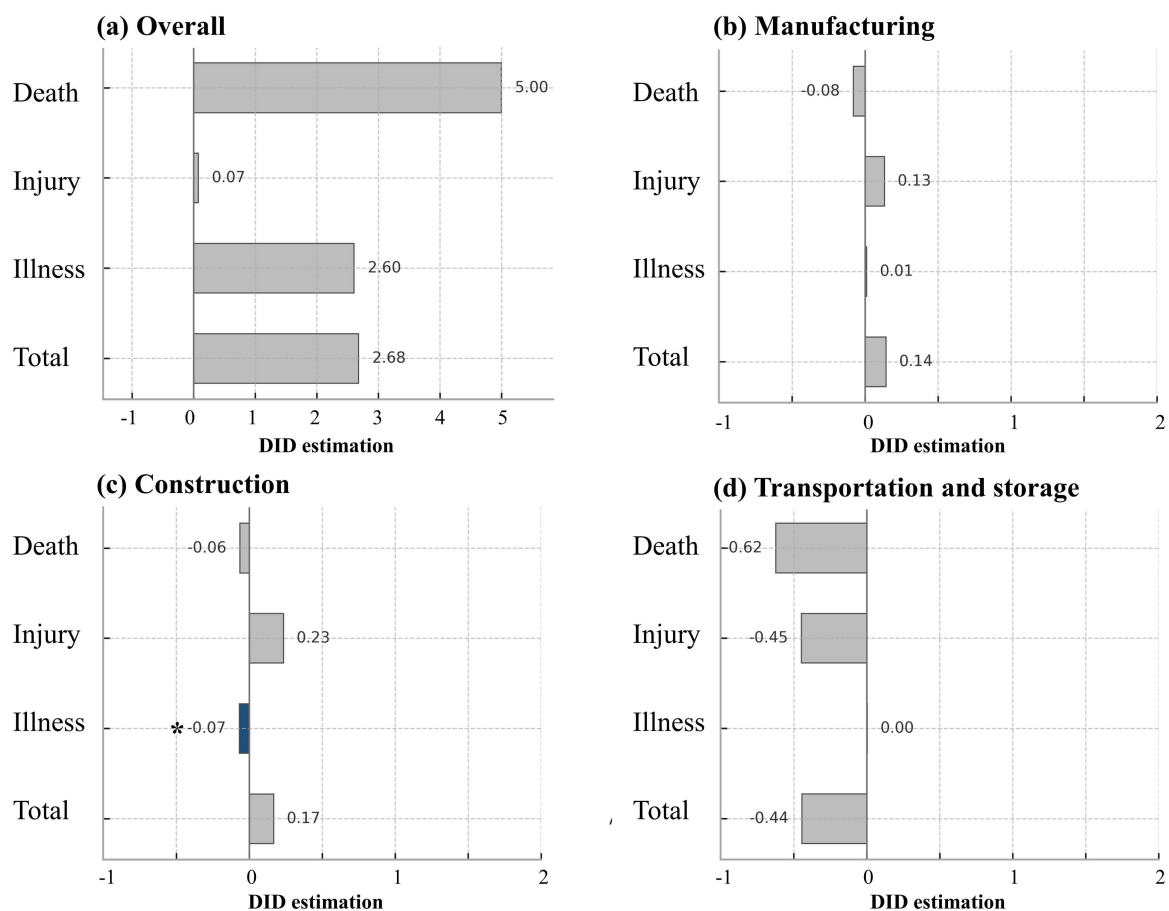


FIGURE 2 | Difference-in-differences (DID) estimates for the Serious Accidents Punishment Act comparing enterprises with ≥ 50 and < 50 employees; results shown for the three highest-risk industries. (a) Overall. (b) Manufacturing. (c) Construction. (d) Transportation and storage.

Despite SAPA's initial success in certain industries, the persistent disparity between large and small enterprises underscores enduring inequities in Korea's occupational safety infrastructure. Enterprises with fewer than 50 workers—still accountable for the majority of occupational fatalities—were not legally covered by SAPA during the study period [7, 26]. Consequently, national statistics likely underrepresent the Act's broader potential effects. The 2024 expansion of SAPA to workplaces employing five or more workers is expected to narrow this structural gap and test the law's scalability [3]. International experience likewise indicates that accountability measures alone are insufficient without concurrent capacity-building for small businesses [27, 28].

Cross-regional analyses show that the effectiveness of occupational safety legislation depends on a balance between deterrence and institutional support [3, 29]. In Korea, SAPA has refocused accountability on corporate leadership, yet enforcement success rests on integrating complementary mechanisms—technical training and consistent inspection—to sustain compliance [30]. Policy environments that emphasize administrative learning and safety-culture development typically precede tangible reductions in occupational hazards [16, 20]. Thus, the evidence here suggests that SAPA's promise lies less in short-term punishment than in the long-term institutionalization of preventive governance.

Although initial enforcement of SAPA did not produce broad, immediate reductions in occupational injury or fatality rates, its observed impact on construction-related diseases suggests early progress in risk prevention. The results indicate that punitive regulation must be paired with supportive measures that build preventive capacity, especially among smaller firms and sub-contracted industries. The 2024 expansion phase presents a critical opportunity to evaluate whether broader coverage and enhanced compliance assistance can accelerate improvements in worker health nationwide. Policymakers should therefore emphasize balanced approaches that integrate long-term regulatory consistency, managerial education, and proactive health surveillance to realize SAPA's full public-health potential.

This analysis benefits from a comprehensive national data set of all compensated occupational incidents in Korea, enabling population-level inference. The DID model effectively controlled for temporal and structural confounders, strengthening causal inference. Nonetheless, several limitations remain. The primary constraint lies in the data source: KCOMWEL's national industrial accident statistics are based on the approval date of compensation claims rather than the actual date of occurrence. Thus, for the study period beginning in 2022, the data set may include incidents that occurred before SAPA enforcement. Additionally, the data are available only annually and cannot be disaggregated monthly, complicating precise alignment with policy timing; some pre-implementation incidents may have been inadvertently included in the post-implementation period. Despite these constraints, this study offers an initial step toward understanding how SAPA has influenced occupational health outcomes during its early enforcement. Ongoing improvements in data transparency and in linking occurrence and compensation systems will be essential to enable more precise causal analyses. Furthermore, the

post-SAPA observation window was limited to two years, restricting assessment of delayed effects. Firm-level covariates such as internal hazard assessments or compliance investments were also unavailable. Because small enterprises were not yet covered by legal enforcement, the findings may underestimate the Act's full potential scope. An additional limitation relates to the use of enterprise size to define treatment and comparison groups. Because SAPA was implemented based on a statutory threshold of 50 employees, this classification reflects the policy design rather than an analytically equivalent comparison. However, enterprises above and below this threshold may differ systematically in baseline safety capacity, regulatory compliance, and implementation of occupational safety and health practices. Although the DID framework accounts for time-invariant differences between groups, residual structural differences may remain. The industry-stratified analyses partially address this limitation by capturing sector-specific heterogeneity and represent a key strength of the present study. In addition, the wide confidence intervals observed in some sector-specific DID estimates should be interpreted in light of methodological constraints. The post-enforcement period was limited to two years, which restricts the stability of post-policy trend estimation. Furthermore, the analysis was based on a limited number of annual time points (2017–2023), limiting the amount of temporal information available for regression-based DID estimation. The interaction term used to estimate the DID effect is inherently subject to greater variability, particularly when combined with sector-stratified analyses that further reduce variation within each subgroup. As a result, statistical precision may be limited despite relatively large point estimates. Accordingly, these findings should be interpreted as preliminary and indicative of potential patterns rather than definitive causal effects.

5 | Conclusion

This study examined the initial effects of SAPA on occupational health outcomes in South Korea using national industrial accident compensation data for 2017–2023. During the early enforcement period (2022–2023), when SAPA applied only to enterprises with 50 or more workers, we observed no statistically significant nationwide reduction in overall occupational injury or fatality rates. However, a measurable decrease was observed in occupational disease rates within the construction sector. Given that this was the only statistically significant sector-level finding, it should be regarded as a preliminary, construction-specific signal that requires confirmation with longer follow-up rather than as definitive evidence of sector-specific benefits. Together, these findings indicate that although SAPA has strengthened managerial accountability and corporate responsibility in occupational safety, the short time frame and limited enforcement scope constrain its immediate measurable impact. Persistent disparities between large and small enterprises further highlight the structural limitations of partial policy coverage. As SAPA extends to businesses with five or more workers from 2024 onward, continued monitoring will be critical to evaluate long-term effects on comprehensive worker safety. Overall, early evidence suggests that SAPA marks a turning point in Korea's occupational safety

governance. Its success, however, will depend on sustained enforcement, equitable inclusion of small enterprises, more granular data systems, and integration of proactive measures such as technical training and consistent inspection. As these complementary mechanisms mature, SAPA can evolve from a primarily punitive framework into a comprehensive, preventive model for worker health and corporate safety accountability.

Author Contributions

Hyewon Park contributed substantially to the conceptualization, design of the study, acquisition, analysis, and interpretation of the data, and drafted the manuscript. Misong Woo contributed to data acquisition and analysis and provided crucial insights into data interpretation. Wanhyung Lee conceived and supervised the study, substantially contributed to the study design, data interpretation, manuscript writing, critical revision for important intellectual content, and provided overall guidance throughout the project. All authors reviewed the manuscript, provided critical feedback, and approved the final version for publication.

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Ethics Statement

This study analyzed publicly available, aggregated national industrial accident statistics that do not contain any personally identifiable information. Therefore, institutional review board approval was not required in accordance with national regulations and institutional policies regarding studies using publicly accessible and de-identified secondary data. No human participants were directly involved in this study.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

This study used publicly available, aggregated national industrial accident statistics provided by the Occupational Safety and Health Research Institute (OSHRI) and the Korea Workers' Compensation and Welfare Service (KCOMWEL). These data sets can be accessed through the OSHRI Open Statistics Portal (<https://oshri.kosha.or.kr/eoshri/index.do>). No individual-level or identifiable data were used. The authors had no special access privileges to the data.

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