MARTIAL ARTS STUDIES

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INSTITUTIONAL REFLEXIVITY AND INJURY SURVEILLANCE IN INDONESIAN HAPKIDO: SHIFTING PEDAGOGIES AND REIMAGINING GOVERNANCE

ABSTRACT

This mixed-methods study examines how injury surveillance operates as a reflexive mechanism shaping coaching and governance in Indonesian Hapkido. Using Giddens' theory of institutional reflexivity, the study analyses four waves of national coach-reported injury data (2019–2025), involving 179 coaches and 3,442 athletes. Quantitative trends, such as a decline in injury prevalence and shifts in injury locations, are interpreted qualitatively to explore institutional responses. A surge in wrist injuries in 2023 prompted notable changes in coaching practices. A turning point occurred during the first national exhibition, which catalysed structured surveillance and revisions to safety protocols, accreditation, and internal reviews. Rather than treating surveillance as passive reporting, this study frames it as a dynamic process of institutional learning. By focusing on a non-Olympic martial art in Southeast Asia, the study contributes to conceptual discussions in martial arts studies, demonstrating how injury monitoring can inform technical reforms and support organisational development.

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KEYWORDS

coaching; Hapkido; injury; injury surveillance; reflexivity

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Institutional reflexivity and injury surveillance in Indonesian Hapkido: shifting pedagogies and reimagining governance

Novita Intan Arovah, Wara Kushartanti and Widya Wasityastuti

INTRODUCTION

Hapkido is a Korean martial art that combines striking, joint locking, throwing, and weapons techniques into a dynamic and hybrid system. Its expansion in Indonesia reflects a broader global interest in Martial and Combat Sports (MCAS), which are increasingly practised for both recreational and competitive purposes (Johnson & Kang, 2018; Ribić, 2008; Rozenfeld, 2021). Practitioners often report a range of physical and psychological health benefits, including increased strength, coordination, flexibility, and self-discipline (Eui-young, 2016; Friedman, 2016; Ishac & Eager, 2021; Zetaruk et al., 2005). However, the intense physical demands of MCAS place athletes at risk of musculoskeletal injuries, ranging from acute trauma such as fractures and dislocations to chronic conditions like tendinitis and joint strain (Jäggi et al., 2015; Park et al., 2021).

Studies from disciplines such as Judo, Taekwondo, Karate, and mixed martial arts consistently report high injury prevalence, with variations in injury type and location shaped by the technical and biomechanical features of each sport (Del Vecchio et al., 2018; Lystad et al., 2021; Sobieraj et al., 2023). Further research in MCAS reinforces this pattern, documenting not only incidence rates (Bledsoe et al., 2006; Lystad, 2015) but also return-to-sport timelines and post-injury performance outcomes (Kingery et al., 2022). Regional studies of Southeast Asian combat styles, such as Pencak Silat, reveal how rule structures, technique profiles, and gender dynamics influence injury distributions (Latif et al., 2022). Beyond epidemiological findings, sociological analyses emphasise that experiences of pain, injury, and recovery in MCAS are mediated by cultural norms and institutional expectations, influencing how athletes interpret risk and resilience within training environments (Spencer, 2012). Together, these works position MCAS as an arena where injury is simultaneously a biomedical, cultural, and organisational phenomenon, reinforcing the need for research that investigates not only injury incidence but also the institutional responses that emerge from it.

Despite its growing presence, Indonesian Hapkido remains understudied with respect to injury patterns, coaching practices and institutional responses. Evidence on athlete safety and risk management remains limited, despite training systems increasingly aligning with broader developments in combat-sport governance and athlete welfare. Without consistent injury tracking and reflective feedback, it becomes difficult to understand how training structures respond to athlete well-being or how evolving risk conditions influence pedagogy and governance. This study takes a different approach by treating injury surveillance as both an empirical and institutional process. Rather than focusing solely on the incidence of injury, it considers how monitoring injury can shape the way martial arts are taught and regulated. Drawing on sociological theory, it explores how injury data and surveillance practices may play a role in coaching reform, safety protocols, and broader shifts in organisational identity. This approach aligns with the MCAS scholarship, showing how information about risk circulates through federations and informs everyday coaching practice. It also positions Indonesian Hapkido within broader national sport developments that increasingly emphasise accountability, athlete safety, and alignment with international governance standards (Wijaya & Silvana, 2024). Together, these shifts help clarify why injury surveillance may emerge as a meaningful driver of organisational change in response to external demands for improved governance, athlete safety, and transparency.

THEORETICAL FRAMEWORK

This study is situated within sociological theory and draws specifically on Anthony Giddens' concept of institutional reflexivity to analyse how injury surveillance may relate to organisational adaptation in Indonesian Hapkido. Institutional reflexivity refers to the capacity of modern institutions to continuously monitor, evaluate, and adjust their practices in response to new information (Beck et al., 1994; Giddens, 2002). In such systems, data collection is not a neutral activity but an active force in shaping institutional norms, procedures, and regulatory frameworks (O'Brien et al., 2014). This lens is particularly suited to examining how martial arts organisations shift from tradition-based pedagogy to more formalised and standardised modes of governance. Historically reliant on lineage and apprenticeship, many federations now face expectations related to athlete safety, institutional accountability, and regulatory coherence. Within this context, injury surveillance is not merely a technical process; it can become a site of institutional learning, reform, and legitimation. These dynamics resonate with Giddens and Beck, who locate such reflexive processes within the broader dynamics of reflexive modernisation, where institutions reorganise themselves in response to heightened risk awareness and external scrutiny (Beck et al., 1994). Through this lens, injury surveillance becomes more than a technical activity; it is a mechanism that enables organisations to adjust practices, demonstrate accountability, and maintain legitimacy. Indonesian Hapkido's adaptations to injury surveillance can therefore be understood as a practical expression of reflexive modernisation, reflecting an emerging orientation toward safety, documentation, and data-driven governance.

While prior studies have explored the epidemiology of martial arts injuries (Duarte et al., 2022; Ji, 2016; Zetaruk et al., 2005), little attention has been given to how such data shape institutional behaviour. Although research demonstrates considerable variation in injury patterns across MCAS disciplines (Del Vecchio et al., 2018; Ross et al., 2021; Stanbouly et al., 2022), few studies examine how federations respond organisationally to these trends. This study extends that discussion by interpreting injury surveillance as a reflexive institutional practice, one that can inform safety reforms, recalibrate pedagogy, and contribute to shifts in governance structures. Viewed through the lens of reflexive modernisation, Indonesian Hapkido's adjustments to injury surveillance can be understood not only as pragmatic responses to athlete injury but also as reflections of broader

pressures toward risk management, documentation, and standardisation in contemporary sport governance. Giddens' theory, in this context, provides a framework for analysing injury monitoring not simply as a technical risk-management tool, but as a mechanism through which organisations engage with wider processes of modernisation (O'Brien et al., 2014). When embedded in recurring national training programmes, surveillance practices offer insight into how Hapkido is being taught, regulated, and strategically positioned within Indonesia's evolving sports landscape, as it navigates the dual imperatives of maintaining martial arts traditions while demonstrating modern, accountable governance.

AIM AND OBJECTIVES OF THE STUDY

Framed by Anthony Giddens' concept of institutional reflexivity within reflexive modernisation, this study aimed to investigate how injury surveillance functions as a mechanism of institutional transformation within Indonesian Hapkido. The inquiry is guided by two core objectives:

1. To examine how training and coaching structures in Indonesian Hapkido have adapted in response to injury surveillance data collected between 2019 and 2025.

2. To interpret the institutional responses to these adaptations and understand how martial arts governance in Indonesia is evolving within broader trajectories of modernisation.

METHOD

Methodological Framework and Ethical Considerations

This study adopts a sequential explanatory mixed-methods design, beginning with quantitative data collection and followed by qualitative inquiry, all situated within Anthony Giddens' theory of institutional reflexivity. This framework conceptualises injury surveillance not only as a technical exercise in data collection but also as an organisational practice that informs and reshapes institutional behaviour. Quantitative data were collected through four waves of standardised surveys administered to Hapkido coaches between 2019 and 2025, systematically capturing patterns in injury incidence, type, and context. These statistical insights were subsequently deepened through qualitative fieldwork conducted during national training camps from 2023 to 2025, which included direct observation and informal engagement with coaches and officials. This allowed the research to trace how numerical data were interpreted on the ground and translated into concrete coaching adjustments and policy revisions.

Ethical approval was secured from the Universitas Gadjah Mada Ethics Committee (No. KE/0499/05/2019). All participants were recruited on a voluntary basis, provided written informed consent, and were assured of complete anonymity. Participation had no bearing on their certification outcomes or standing within the federation.

Data Collection Strategy

The research was conducted over four waves of data collection (2019, 2023, 2024, and 2025) during national coach certification programmes. The COVID-19 pandemic (2020–2022) caused an unplanned interruption, creating a natural breakpoint in the study that enabled comparative analysis of training approaches before and after the pandemic. The quantitative component utilised standardised injury surveillance questionnaires, administered to active coaches who had trained athletes within the preceding three months. These surveys systematically recorded injury patterns across several parameters, including training versus competition contexts, anatomical injury locations, and types of injuries.

To complement the quantitative findings, the qualitative component drew on embedded fieldwork during training camps between 2023 and 2025. During these camps, researchers presented findings from the previous year's data collection, conducted direct observations of training sessions, engaged in informal conversations with coaches and federation officials, and reviewed updated coaching materials. Notes were taken during and immediately after these encounters, and the quotations presented in the Results section reflect phrasing recorded in these contemporaneous field notes rather than audio-verbatim transcripts. This qualitative inquiry focused on how federations and coaches interpreted the injury data and translated it into practice, such as through modifications in technique, the implementation of improved safety measures, and revisions to governance policies.

Analytical Approach

This study employed a two-phase analytical strategy, each phase corresponding to one of the guiding research questions. The first phase addressed the initial objective: to investigate how Indonesian Hapkido adapted its training and coaching practices in response to emerging injury trends. Descriptive analysis of survey data collected between 2019 and 2025 was used to identify changes in injury prevalence, typology, and anatomical distribution. To assess whether observed changes in injury patterns were statistically meaningful, chi-square tests were conducted on two levels: (a) overall injury prevalence (injured vs. not injured) and (b) the distribution of injury-event categories across the four survey years. These tests were not used to model epidemiological risk but to identify quantitative signals that coaches and officials interpreted in their ongoing adjustments to training and organisational practice. These trends were triangulated with field observations from training camps held between 2023 and 2025, as well as discussions with coaches and federation officials, to understand how the data were interpreted and acted upon.

The second phase addressed the second objective, which was to examine how injury surveillance itself contributed to institutional transformation. Rather than focusing solely on injury outcomes,

this phase explored surveillance as a reflexive mechanism within the organisation. The analysis examined how injury data evolved into an internal discourse that shaped decision-making, set priorities, and influenced governance practices. Particular attention was given to the period surrounding the first national Hapkido exhibition in 2021, analysing how this event marked a turning point in coaching pedagogy and broader modernisation efforts within the federation.

RESULTS

Training and Coaching Adaptations in Response to Injury Trends (Objective 1)

Participation, Institutional Reach and Training Capacity

This study analysed injury surveillance data reported by 179 Indonesian Hapkido coaches, covering a cumulative total of 3,442 athletes over four national training events held between 2019 and 2025. Table 1 summarises the survey details.

Year, Month	Coach	Athlete
2019, Nov	53	839
2023, March	44	935
2024, May	37	821
2025, May	45	794
Total	179	3442

Table 1. Survey Details

Coach demographics remained consistent across survey waves, with the majority of instructors in their mid-to-late 30s, indicating a stable core of experienced practitioners. Training frequency also remained relatively unchanged, with most coaches conducting two sessions per week. However, by 2024–2025, a subset of coaches reported increased training intensity, exceeding 18 sessions per month. Interviews suggested that this shift was driven either by growing demand from athletes or by regional policy initiatives in areas experiencing a rapid rise in Hapkido's popularity. Figure 1 illustrates the geographical distribution of coaches and athletes included in this study.

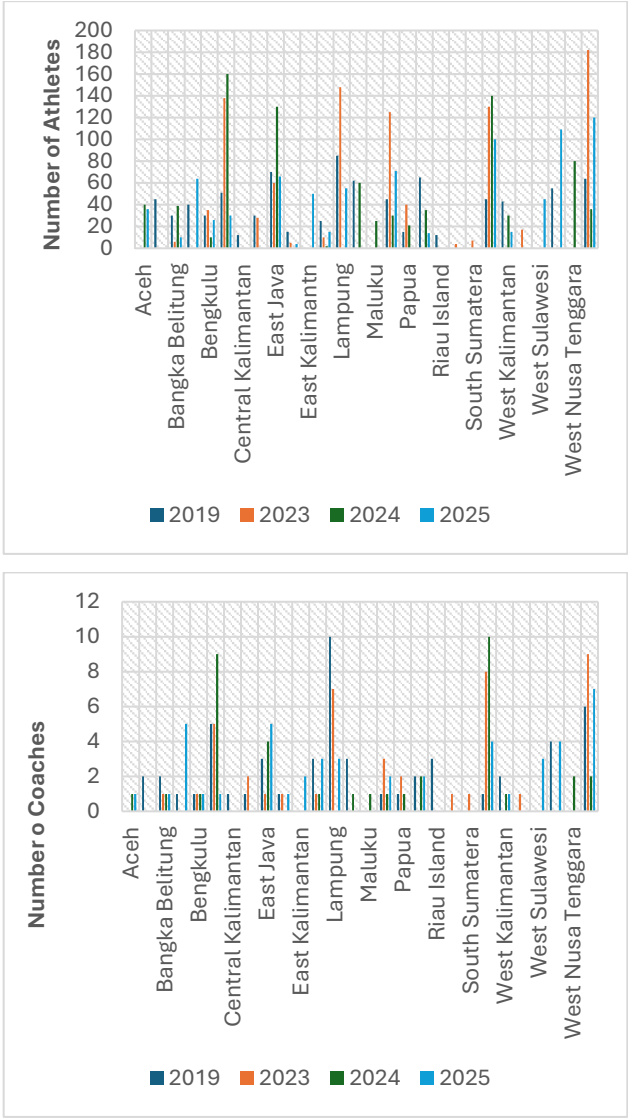

Figure 1. The Distribution of Athletes and Coaches Based on Provinces

Geographically, participating coaches in this study represented 28 of Indonesia's 38 provinces. Coach and athlete representation was concentrated in Java and Sumatra, particularly in Yogyakarta, West Java, Central Java, East Java, and Lampung. By 2025, new participation from provinces such as East Kalimantan and West Sulawesi was documented. Discussions with federation officials and coaches indicated that participation from Eastern Indonesia remained limited, primarily due to ongoing structural challenges, including limited coach availability and logistical difficulties. Observations and reports from the field noted an increase in training frequency and broader provincial engagement over time. These developments were frequently described by coaches and administrators as signs of organisational growth, with implications for improving data collection and expanding coaching initiatives.

Injury Prevalence and Shifting Risk Awareness

Figure 2 shows that between 2019 and 2025, overall injury prevalence among Indonesian Hapkido athletes declined from 23.1% to 15.6%. In 2025, a slight increase to 16.0% was recorded. A chi-square test comparing injured and non-injured athletes across the four survey years revealed a statistically significant reduction in injury prevalence, $\chi^2(3) = 51.34$, $p < .001$. Discussions with coaches and federation officials attributed the overall decline to reported improvements in training routines, increased attention to injury prevention, and adjustments in coaching strategies. The minor rise in 2025 was noted during surveillance as an area requiring further monitoring. Observations from the field and follow-up interviews emphasised that injury patterns remained variable and influenced by multiple contextual factors, suggesting that preventive measures may need to be continuously reviewed and updated.

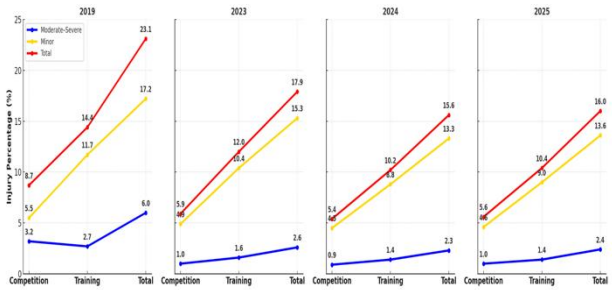

Figure 2. The injury prevalence

Minor injuries accounted for most reported cases and showed a consistent downward trend across the study period. In discussions, coaches attributed this decline to the use of structured warm-up routines, improved load management, and refinements in technique during training. In contrast, moderate-to-severe injuries remained relatively stable across all waves, ranging from 2.3% to 6.0% of total injuries. Observations and interview data indicated that these more serious injuries were associated with high-impact or complex training activities, which coaches noted were more difficult to address through routine adjustments alone. A chi-square test of the distribution of injury-event categories (minor vs. moderate–severe, training vs. competition) across the four years also showed a significant reduction over time, $\chi^2(9) = 21.28$, $p = .011$, indicating that not only overall injury prevalence but also the composition of injury types reduced across the surveillance period.

Injury surveillance data consistently showed that most injuries occurred during training sessions rather than in competition. Field observations and coach interviews emphasised the influence of daily instructional practices, supervision quality, and training load design on athlete risk. Several coaches reported adjusting routine practices in response to surveillance findings, including modifying drills and emphasising proper progression. Despite these efforts, a slight increase in overall injuries in 2025, along with the continued presence of moderate-to-severe cases, suggests that challenges remain, particularly in managing high-risk drills, physical conditioning, and preparedness for acute injury response. Coaches and federation officials noted that while some progress had been made, the high incidence of injuries reinforced the need for ongoing refinement of coaching practices and sustained injury monitoring to strengthen safety measures and reduce preventable injuries over time.

Anatomical Injury Trends and Movement Focus

The anatomical distribution of injuries changed over time, as shown in Figure 3. At the beginning of the study in 2019, injuries were relatively evenly distributed across upper and lower body regions. Surveillance data from this period reflected a wide range of training activities, including strikes, falls, grappling, and joint manipulation, with no single anatomical region disproportionately affected. By 2023, however, wrist injuries accounted for over 35% of reported cases, making them the most common site of injury. Field observations and coach interviews during this period noted an increased emphasis on drills involving joint locks, breakfalls, and blocking techniques, which may have contributed to greater upper-limb loading. Simultaneously, lower-limb injuries, particularly to the ankle and toe, decreased in frequency. Some coaches suggested that this pattern may reflect a temporary reduction in lower-body training intensity or shifts in technical focus during that period.

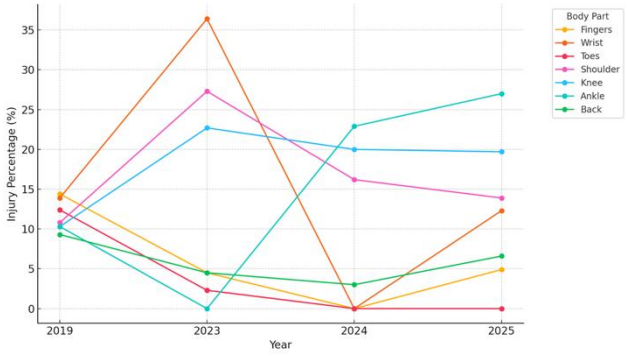

Figure 3. Injury Location

In 2024 and 2025, surveillance data showed a reversal in injury patterns. Wrist injuries declined, while ankle and knee injuries increased significantly, with ankle injuries alone comprising over 25% of reported cases by 2025. Observations from training sessions and discussions with coaches indicated an increased emphasis on dynamic movement drills, such as footwork, pivots, and kicking techniques, during this period. Some coaches suggested that these changes in training focus may have reduced

upper-limb strain but introduced greater biomechanical demands on the lower extremities.

Other anatomical regions also showed notable changes. Shoulder injuries decreased steadily after 2023, while back injuries, initially infrequent, became more common in the final wave of data collection. Coaches and federation officials attributed these shifts to changes in warm-up routines, refinements in fall techniques, and increased focus on posture and spinal mechanics during training. These patterns were frequently cited as evidence of evolving coaching responses to previous injury data, with adjustments made to mitigate specific risks. However, field reports also highlighted that as certain vulnerabilities were addressed, new areas of risk emerged, underscoring the ongoing need for adaptation and monitoring in training practices.

Injury Typology and Pedagogical Response

Changes in injury typology over time, as illustrated in Figure 4, reflect shifting patterns in reported harm. In 2019, surveillance data showed a relatively balanced distribution of injury types, with contusions, strains, sprains, and lacerations reported in comparable proportions. Observations and interviews with coaches during this period described a broadly inclusive training model that incorporated a wide range of techniques and drills. No single injury mechanism appeared to dominate, and the overall risk appeared to be distributed across diverse training activities.

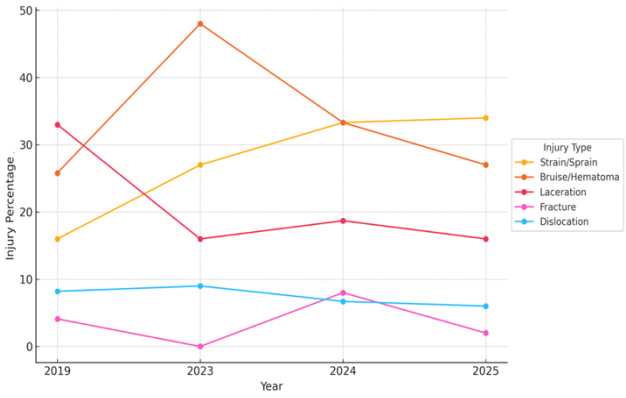

Figure 4. Injury Types

By 2023, surveillance data showed an increase in strains and contusions, injuries typically associated with soft tissue stress and repetitive loading. Coaches interviewed during this period noted that training sessions had become more technically intensive, with some reporting concerns about athletes' physical preparedness and the adequacy of recovery protocols. Field observations also recorded limited emphasis on structured physical conditioning in several training environments.

In 2024 and 2025, the data showed a notable decline in strain-related injuries alongside a partial increase in reported lacerations and sprains. Several coaches reported adjusting their warm-up routines, reducing repetitive high-load drills, or introducing more protective strategies in response to prior injury trends. Observers noted greater variation in training structure and a more visible focus on managing physical risk. These developments were frequently described by federation officials and coaching staff as responses to injury surveillance feedback, aimed at improving athlete safety through training modification.

Institutional Reflexivity and the Reflexive Modernisation of Governance (Objective 2)

From Injury Event to Organisational Learning (2021–2022 Turning Point)

Informal accounts from coaches and federation officials indicated that the 2021–2022 National Hapkido Exhibitions acted as a turning point in organisational attention to athlete safety. Several injuries during the 2022 event drew comments from the Indonesian National Sports Committee (KONI), whose representatives expressed concern about the high number of injuries in relation to the upcoming PON (National Sports Weeks), a major national competition in Indonesia. According to one federation official,

> *KONI warned us that if the injury rate stayed this high, it could affect our chances for full inclusion in PON 2024."*

Following this meeting, Hapkido leadership repeated KONI's message to provincial coaches and instructed them to strengthen safety practices. As one chairman explained,

> *We told all regional coaches exactly what KONI told us, safety must be tightened immediately.*

Interviews and field notes documented several safety-oriented adjustments introduced from 2022 onward, including the adoption of thicker mats, the addition of injury-prevention material to coach certification activities, and the initiation of injury-prevention education during national training camps. These accounts indicate a shift in how the organisation interpreted injury incidents, with safety becoming more explicitly integrated into training routines and governance practices.

Surveillance-Driven Pedagogical Recalibration

Analysis of injury surveillance data revealed changes in training practices that appeared to follow the observed trends in injuries. Following a notable increase in wrist injuries in 2023, several coaches reported implementing targeted interventions, including strengthening exercises, adjustments to joint lock techniques, and more frequent injury monitoring during sessions. By 2024–2025, a decline in wrist injuries was recorded in the data. During the same period, however, injuries to the ankle and knee increased, suggesting a shift in injury distribution rather than a total reduction in risk. Observations and interviews revealed that coaches were utilising surveillance data to inform decisions regarding physical conditioning and technical instruction. These reports highlighted an increasingly responsive approach to

training, in which emerging injury patterns informed the design and delivery of coaching strategies.

Surveillance, Standardisation, and Institutional Legitimacy

By 2025, injury surveillance had become a routine part of federation activities. Standardised reporting procedures were in place at all national training camps, and collected data were used to evaluate aspects of coaching performance and to support external communications. According to interviews, senior federation officials cited reductions in injury rates as evidence of programme improvement and organisational progress. As one official explained,

> *The numbers help us show progress. When injuries go down, it reflects well on the program.*

Field reports and internal documents indicated that surveillance practices served both operational and representational functions, informing safety-related adjustments while also contributing to the federation's public image. Although these practices had not yet been formalised through official policy, the regular use of injury monitoring was widely seen by staff and coaches as a step toward procedural standardisation and expanded use of data within organisational decision-making.

DISCUSSION

This study contributes to martial arts research by shifting the focus of injury surveillance from descriptive epidemiology to its role in institutional reflexivity and pedagogical change. While most research on martial arts injuries documents prevalence and typology across disciplines like judo, taekwondo, and MCAS (Del Vecchio et al., 2018; Duarte et al., 2022; Lystad et al., 2021; Stanbouly et al., 2022), this study highlights how longitudinal surveillance can support both risk reduction and organisational learning. Drawing on Giddens' theory of institutional reflexivity, it conceptualises injury monitoring as a strategic and symbolic tool through which Indonesian Hapkido responds to embodied risk, reshaping training methods, coaching practices, and institutional authority.

In addressing the first research objective, this study presents evidence of concrete, practice-level change in Indonesian Hapkido in response to training and coaching structures that adapt to injury surveillance. Data from four national coach surveys (2019–2025) indicate a steady decline in overall injury prevalence, particularly in minor injuries such as contusions and strains. This trend reflects an increased institutional capacity to integrate surveillance data into pedagogical practice. Following a rise in wrist injuries in 2023, coaches implemented targeted measures, including wrist-strengthening exercises and modified joint-lock techniques. These interventions demonstrate a shift toward proactive risk mitigation. This aligns with scholarship suggesting that martial arts training is responsive to embodied feedback and context-specific adaptation (Ji, 2016; Sobieraj et al., 2023). However, unlike studies that frame such changes as reactive, this study interprets them as evidence of a reflexive, data-driven pedagogy, where coaching practices are recalibrated continuously in response to injury trends.

Further evidence of reflexive adaptation emerges from shifts in anatomical injury patterns. Between 2023 and 2025, a decline in upper-limb injuries was followed by a rise in ankle and knee injuries, indicating a redistribution of biomechanical risk as the curriculum increasingly emphasised lower-body techniques and dynamic footwork. This pattern parallels findings in other martial arts where pedagogical changes correspond with shifts in injury location (Del Vecchio et al., 2018; Zetaruk et al., 2005). This study extends those observations by demonstrating that such shifts are not confined to the practice level but reflect coordinated, national-level adjustments. The adoption of risk-sensitive pedagogy, aligned with specific injury trends, signals a more systematic integration of surveillance data into instructional design.

Addressing the second research objective, interpreting institutional responses to coaching adaptations, this study illustrates how injury surveillance has begun to influence governance practices in Indonesian Hapkido. Institutional events, particularly the 2021 National Hapkido Exhibition and the subsequent 2022 reforms, offer concrete evidence of reflexivity in practice. Post-exhibition measures such as the adoption of thicker mats, mandatory injury prevention modules, and formalised reporting procedures marked a pivotal shift in risk management. Injuries were no longer viewed as incidental, but increasingly interpreted as actionable data informing systemic reform. This aligns with Giddens' notion that modern institutions enhance their capacity for self-monitoring and adaptive change through feedback mechanisms. In contrast to the formalised injury protocols found in Olympic sports such as taekwondo or judo, the Indonesian Hapkido response remains emergent and semi-formal. Nonetheless, the overall trajectory suggests growing standardisation, institutional reflexivity, and alignment with broader norms of athlete safety and organisational responsibility.

This study also finds that injury surveillance had become part of both performance evaluation and institutional communication. This shows that surveillance played a dual role: it was used to manage risks and also to represent the organisation's credibility. Senior instructors began to cite lower injury rates as proof of successful coaching, making surveillance a tool for gaining trust both within and outside the federation. This supports earlier studies on how martial arts are becoming more bureaucratic and institutionally organised (Ramirez, 2023; YoungIl, 2019). It also adds to that work by showing how technical practices like injury reporting can drive organisational change. Using injury data to demonstrate competence not only shows practical adaptation but also a symbolic move toward widely accepted norms, such as transparency and accountability. While not yet formalised as policy, the growing use of surveillance data suggests that a new governance model is emerging, one that relies on data visibility and procedural responsibility to guide decisions.

These organisational patterns can also be understood within the broader dynamics of reflexive modernisation in Indonesian sport. As national federations increasingly operate under expectations of accountability, transparency, and evidence-based governance, injury surveillance becomes both a practical tool and a symbolic resource through which organisations demonstrate their alignment with late-modern standards of safety and institutional professionalism. The reflexive adjustments observed in Indonesian Hapkido, ranging from technical reforms to enhanced reporting practices, thus reflect not only internal responses to injury trends but also broader pressures shaping contemporary sport governance in Indonesia.

The findings suggest several concrete implications for federation governance and coach training. First, injury surveillance could be formalised into mandatory reporting protocols at all national and regional training events, with clear guidance on case definitions and reporting timelines. Second, surveillance summaries should be routinely fed back into coach education, for example, through annual briefings or modules that use recent data to illustrate emerging risk patterns and appropriate training modifications. Third, safety measures introduced in response to specific incidents, such as mat standards, warm-up requirements, and limits on high-risk drills, could be codified into competition and training regulations rather than remaining informal practice. Finally, the federation may consider establishing a dedicated committee or working group responsible for reviewing injury reports, recommending technical adjustments, and communicating findings to stakeholders. Such measures would help translate reflexive monitoring into durable governance structures, strengthening both athlete protection and organisational accountability.

Although this study provides an extended, multi-year account of how injury surveillance contributes to pedagogical and institutional change in Indonesian Hapkido, several limitations should be acknowledged when interpreting the findings. First, while the survey design remained consistent across the years, the data depend on coach-reported injury histories, which may involve underreporting or memory bias. Second, the lack of national training events between 2020 and 2022 due to COVID-19 disrupted the timeline and may have hidden important developments. Informal conversations with coaches and officials also contributed useful context, but were not recorded, which limits their reproducibility. Despite these issues, the study has several important strengths: it spans multiple years, achieved a strong response rate from four national events, and employs a theoretical framework that connects injury surveillance with institutional change. By treating injury not only as a health outcome but also as a window into organisational behaviour, the study offers insights for other martial arts federations seeking to use data to improve coaching and governance. The findings suggest that institutional reflexivity in Indonesian Hapkido includes both practical changes in training and symbolic efforts to present the organisation as competent and accountable. Future research should track these changes over a longer period and examine whether current patterns of standardisation become formal policy. Comparative studies with both Olympic and non-Olympic martial arts in Southeast Asia could also help place the Indonesian case in a broader regional context. In addition, qualitative research, such as structured interviews with coaches and athletes, could deepen understanding of how surveillance data are interpreted and used at different levels of the organisation.

CONCLUSION

This study has shown that injury surveillance in Indonesian Hapkido has evolved from a passive tool for documenting harm into a reflexive mechanism that informs both pedagogical adaptation and institutional learning. Across four waves of surveillance from 2019 to 2025, the data revealed a decline in overall injury prevalence and a notable shift in anatomical and typological patterns. Coaches responded by adjusting training emphases, particularly in reducing wrist-related injuries after 2023, signalling a growing engagement with data to guide risk mitigation and instructional reform. The federation's institutional response became especially visible after the 2021 national exhibition, when injury monitoring began to feature more prominently in internal evaluation and communication processes. Although not yet codified in formal policy, these practices reflect an emerging orientation toward organisational accountability and athlete welfare. Consolidating these practices into formal reporting requirements, coach education curricula, and safety regulations would be a logical next step for the federation, ensuring that reflexive monitoring mechanisms are sustained beyond individual leaders or events. Surveillance, in this context, has also acquired a symbolic role, reinforcing the legitimacy of evolving governance practices within a traditionally informal martial arts system. By framing these developments through the lens of institutional reflexivity, this study contributes to a deeper understanding of how injury surveillance can catalyse both pedagogical change and governance renewal. It demonstrates that even within non-Olympic martial arts, data practices can underpin strategic learning and institutional evolution. Ongoing surveillance will be essential to assess the durability and future institutionalisation of these shifts.

Declaration of competing interests

The authors declare no competing interests.

Declaration of artificial intelligence use

The authors affirm that no artificial intelligence applications were used in the preparation of this manuscript.

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