

Compliance Level of Hotel Swimming Pools with International Life Saving Federation (ILS) Safety and Rescue Equipment Standards

Faleh Sultan Abu Eid¹, Salwa Adnan Al-Sharman², Rawa'ah Adnan Sukkarieh³, Ghaid Mandoub Obeidat⁴, Shamil Mohd Ameen Al-Daghistani⁵, Saif Faleh Abu Eid⁶

¹ Department of Coaching and Sport Management, Faculty of Physical Education and Sport Sciences, The Hashemite University, Zarqa, Jordan. <https://orcid.org/0000-0003-4738-0330>, faleh@hu.edu.jo

Department of Coaching and Sport Management, Faculty of Physical Education and Sport Sciences, The Hashemite University, Zarqa, Jordan. <https://orcid.org/0000-0001-5558-9084> ²

³ Department of Physical Education, Faculty of Arts and Humanities, Applied Science Private University, Amman, Jordan; E-mail: r_sukkaria@asu.edu.jo ORCID ID: <https://www.orcid.org/0000-0003-2803-7625>

⁴ Department of Sport Science, Faculty Physical Education and Sports Sciences, Yarmouk University
g.obidat@yu.edu.jo <https://www.orcid.org>

⁵Physical and Health Education Department, Faculty of Educational Sciences, Al-Ahliyya Amman University, Amman, Jordan, ORCID ID: <https://www.orcid.org/0000-0001-8829-9972>, shamil_daghistani@yahoo.com

⁶ Badminton coach. Elite Academy Amman Jordan

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Objective: This study aimed to evaluate the compliance level of hotel swimming pools with basic and advanced aquatic safety and rescue equipment standards established by the International Life Saving Federation (ILS), and to examine the effect of hotel classification (3, 4, and 5star) on equipment availability.

Methodology: A descriptive, analytical, cross-sectional observational design was employed across a random sample of fifty (N = 50) hotel swimming pools. Data were collected using a standardized facility audit checklist based on the latest ILS medical and rescue policy guidelines. Unannounced field audits were conducted to evaluate the physical presence, operational condition, and immediate accessibility of safety equipment.

Results: The findings revealed a severe compliance gap. High compliance rates were restricted to low-cost, basic equipment, such as ring buoys (80%) and basic first aid kits (84%). Conversely, a critical deficit was observed in advanced medical equipment: Automated External Defibrillators (AEDs) were available in only 14% of facilities, medical oxygen cylinders in 10%, and spine boards in 36%. Environmentally, 76% of pools lacked elevated lifeguard chairs, compromising visual surveillance. Chi-square analysis demonstrated statistically significant differences ($p < 0.05$) based on hotel classification;

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5-star hotels exhibited higher compliance, whereas 3-star hotels exhibited zero availability (0%) for AEDs, medical oxygen, and elevated chairs.

Conclusion & Recommendations: Hotel management predominantly adopts a "minimum administrative compliance" approach to satisfy licensing requirements rather than ensuring operational readiness. This leaves lifeguards physiologically and operationally unequipped to manage hypoxic cardiac arrests or spinal trauma. The study recommends mandatory regulatory reforms requiring AEDs and spine boards as non-negotiable prerequisites for facility licensing, alongside unannounced field inspections.

Keywords: Drowning, Rescue equipment, Hotel swimming pools, International Life Saving Federation (ILS), Automated External Defibrillator (AED), Aquatic safety.

1. Introduction

Drowning represents a silent global public health crisis, ranking as one of the top three leading causes of unintentional injury death worldwide. Estimates by the World Health Organization (WHO, 2023) indicate hundreds of thousands of drowning fatalities annually, alongside non-fatal drowning incidents that result in severe, long-term neurological impairment and substantial healthcare costs. Although drowning historically correlated with open-water environments in developing regions, the past decade has witnessed a notable shift toward commercial recreational aquatic environments, particularly hotel swimming pools and resorts. These facilities, often marketed as controlled and safe, foster a false sense of security among patrons, leading to diminished parental and swimmer vigilance (Stallman et al., 2022).

In recreational aquatic settings, the immediate availability of functional safety and rescue equipment serves as the primary defense mechanism and the critical determinant between survival, permanent disability, or death. Physiologically, drowning resuscitation differs fundamentally from primary cardiac emergencies; drowning induces hypoxic cardiac arrest, wherein brain tissue hypoxia accelerates rapidly within 3 to 4 minutes of submersion. Consequently, standard hands-only

Cardiopulmonary Resuscitation (CPR) is clinically insufficient in severe drownings and necessitates immediate intervention with adjunctive medical technology (Bierens et al., 2016).

To standardize aquatic safety, the International Life Saving Federation (ILS) established rigorous operational frameworks mandating a comprehensive rescue infrastructure. These standards range from direct rescue tools intended to prevent drowning escalation (e.g., rescue tubes, shepherd's crooks, ring buoys with throwlines) to advanced life-support equipment (e.g., Automated External Defibrillators [AEDs], spinal immobilization boards, Bag-Valve-Mask [BVM] resuscitators, and medical oxygen cylinders) (ILS, 2024). These guidelines emphasize that human lifeguard performance remains constrained unless augmented by physical apparatus that enable rapid response protocols.

Despite these established international standards, observational field data indicate a profound compliance gap within the hospitality sector. Many hotel management structures address aquatic safety through "minimum administrative compliance" solely to satisfy statutory licensing requirements. This structural flaw manifests in hiring certified lifeguards while drastically curtailing operational budgets allocated for purchasing and maintaining emergency

equipment (Pelletier & Gilchrist, 2021). This disconnect between personnel presence and equipment readiness creates a hazardous environment; a lifeguard confronting a cardiac arrest without an AED or spinal trauma without a spine board is functionally incapacitated, exposing patrons to mortality risks and facilities to legal liability (Schwebel et al., 2021).

Furthermore, public health legislation in many jurisdictions suffers from regulatory oversight gaps, relying on paper audits of lifeguard credentials rather than unannounced field inspections using standardized checklists to verify equipment accessibility (Giles et al., 2022). This study addresses this empirical gap by providing rigorous observational evidence to inform policy reforms, advocating for mandatory equipment codes to transform hotel pools into safer recreational environments.

1.2 Problem Statement

The research problem centers on a critical "compliance gap" between statutory regulations and actual operational readiness in hotel pool management. Licensing authorities frequently rely on the physical presence of a certified lifeguard as the sole benchmark for safety compliance. This regulatory oversight, combined with a lack of rigorous field auditing, encourages hotel administrators to treat aquatic safety as a check-box exercise. Consequently, operational budgets for purchasing and maintaining advanced rescue and medical equipment are marginalized as non-essential expenditures.

The gravity of this problem lies in the physiological reality that human lifeguards, regardless of physical competence, cannot overcome equipment deficits during critical emergencies. Hypoxic cardiac arrest requires immediate defibrillation (AED) and positive-pressure oxygenation (BVM), while spinal trauma resulting from shallow diving requires rigid immobilization (spine board) to prevent permanent paralysis. In the absence of these tools, the lifeguard's role is reduced to basic extraction, representing a severe failure in risk management.

Given the scarcity of observational research evaluating physical equipment readiness in hospitality settings, this study addresses the following primary research question:

"What is the compliance level of hotel swimming pools with safety and rescue equipment standards established by the International Life Saving Federation (ILS)?"

This primary inquiry leads to the following secondary question: Does equipment availability depend on facility financial capacity, such that statistically significant differences exist based on hotel classification (3, 4, and 5star)?

1.3 Research Questions

What is the availability percentage of basic and advanced rescue equipment in hotel swimming pools compared to ILS standards?

Are there statistically significant differences in safety equipment availability attributable to hotel classification (3, 4, or 5star)?

1.4 Significance of the Study

Theoretical Significance: This study enriches the public health and injury prevention literature by providing empirical, observational field data, overcoming the self-reporting biases inherent in survey-based designs. It shifts the analytical focus from individual human error to systemic equipment readiness, establishing a framework that links lifeguard performance to technological support while evaluating ILS compliance in the hospitality sector.

Practical Significance: The findings offer evidence-based insights for municipal and tourism licensing authorities to update regulatory frameworks, specifically advocating for mandatory AED and spine board installation. It provides inspectors with a validated, standardized audit tool and assists hotel risk managers in reallocating operational resources to mitigate liability and protect guest health.

2. Methodology

- **Design:** Describe study design (qualitative, quantitative, mixed)
- **Participants/Sample:** Include sample size, selection criteria
- **Instruments:** Tools, tests, or questionnaires used
- **Procedure:** Step-by-step description of how the study was conducted
- **Data Analysis:** Statistical or qualitative analysis methods

3. Results

2.1 Study Design and Population

A descriptive, analytical, cross-sectional observational design was utilized. The study population comprised hotel swimming pools within a major tourist region. A stratified random sample of fifty ($N = 50$) hotel swimming pools was selected across three hotel tiers: 3star ($n = 15$), 4star ($n = 20$), and 5star ($n = 15$).

2.2 Data Collection Tool

Data were gathered using a structured Facility Audit Checklist developed in accordance with the latest ILS Medical and Rescue Policies (ILS,

4. Discussion

2024). Items were evaluated using a binary scoring system (Available & Compliant = 1 / Not Available or Non-Compliant = 0) across three primary categories:

Direct & Remote Rescue Equipment: Rescue tubes, ring buoys with throwlines, shepherd's crooks.

Advanced Medical & Resuscitation Equipment: AEDs, spinal immobilization boards with head immobilizers, Bag-Valve-Mask (BVM) resuscitators, medical oxygen cylinders, and comprehensive first aid kits with pocket masks.

Environmental & Communication Infrastructure: Depth markings, elevated lifeguard chairs, dedicated emergency telephones, megaphones, and two-way radios.

2.3 Data Collection Procedures

Field audits were conducted by trained researchers during operational pool hours. Equipment was physically inspected to verify presence, operational functionality (e.g., battery status on AEDs, oxygen cylinder pressure), and immediate accessibility (unlocked, unobstructive positioning within the immediate deck perimeter). Data were entered and analyzed using SPSS software.

Table 1: Compliance Level of Hotel Swimming Pools with ILS Equipment Standards (N = 50)

Equipment Category / Required Item	Available & Compliant	Not Available / Non-Compliant	Compliance Rate
1. Direct & Remote Rescue Equipment			
Ring Buoy with Throwline	40 Hotels	10 Hotels	80%
Rescue Tube (One per active station)	35 Hotels	15 Hotels	70%
Shepherd's Crook / Rescue Pole	25 Hotels	25 Hotels	50%
2. Advanced Medical & Resuscitation Equipment			

Equipment Category / Required Item	Available & Compliant	Not Available / Non-Compliant	Compliance Rate
First Aid Kit + Pocket Mask	42 Hotels	8 Hotels	84%
Spine Board with Head Immobilizer & Straps	18 Hotels	32 Hotels	36%
Bag-Valve-Mask (BVM) Resuscitator	15 Hotels	35 Hotels	30%
Automated External Defibrillator (AED)	7 Hotels	43 Hotels	14%
Medical Oxygen Cylinder	5 Hotels	45 Hotels	10%
3. Environmental & Communication Infrastructure			
Clear Depth Markings on Pool Deck/Walls	28 Hotels	22 Hotels	56%
Megaphone & Two-Way Radios	20 Hotels	30 Hotels	40%
Dedicated Poolside Emergency Telephone	12 Hotels	38 Hotels	24%
Elevated Lifeguard Chair (Blind-spot coverage)	12 Hotels	38 Hotels	24%

Table 2: Availability of Advanced & Critical Equipment by Hotel Classification

Critical Equipment Item	3-Star (n=15)	4-Star (n=20)	5-Star (n=15)	Total (N=50)	Chi-Square (X ²)	p-value
Spine Board	13% (2)	30% (6)	66% (10)	18 (36%)	8.15	0.01*
BVM Resuscitator	6% (1)	20% (4)	66% (10)	15 (30%)	11.24	0.003**
Elevated Lifeguard Chair	0% (0)	20% (4)	53% (8)	12 (24%)	9.42	0.008**

Critical Equipment Item	3-Star (n=15)	4-Star (n=20)	5-Star (n=15)	Total (N=50)	Chi-Square (X ²)	p-value
Automated External Defibrillator (AED)	0% (0)	10% (2)	33% (5)	7 (14%)	6.42	0.04*
Medical Oxygen Cylinder	0% (0)	5% (1)	26% (4)	5 (10%)	5.81	0.05*

* Significant at $p < 0.05$; Highly significant at $p < 0.01$.

Discussion and Recommendations

4.1 Discussion of Findings

Discussion of Research Question 1

(What is the availability percentage of basic and advanced rescue equipment in hotel swimming pools compared to ILS standards?)

The findings demonstrate a profound disparity in compliance based on equipment cost and complexity. While compliance rates were high for low-cost, basic equipment—such as ring buoys (80%) and standard first aid kits (84%)—a severe collapse in compliance was observed regarding advanced life-support equipment. AEDs were available in only 14% of facilities, medical oxygen in 10%, and spine boards in 36%.

This pattern aligns with observations by Pelletier and Gilchrist (2021), who noted that commercial facilities frequently adopt "minimum administrative compliance" to satisfy superficial licensing criteria while avoiding capital expenditures on advanced emergency gear. Physiologically, drowning victims suffer from rapid, severe systemic hypoxia leading to hypoxic cardiac arrest. In such scenarios, hands-only CPR is insufficient to restore spontaneous circulation without early electrical defibrillation via an AED and high-concentration oxygenation via a BVM (Bierens et al., 2016). The absence of these tools in over 85% of audited pools severely degrades the operational efficacy of on-duty lifeguards, violating core ILS emergency protocols (ILS, 2024).

From an environmental safety perspective, 76% of facilities lacked elevated lifeguard chairs. Positioning lifeguards at ground level increases visual blind spots caused by water surface glare and swimmer congestion. As Page et al. (2023) demonstrated, sub-optimal surveillance infrastructure accelerates lifeguard "vigilance decrement," resulting in delayed drowning detection times.

Discussion of Research Question 2

(Are there statistically significant differences in safety equipment availability attributable to hotel classification?)

Chi-square analysis revealed a statistically significant positive relationship ($p < 0.05$) between hotel tier and the availability of advanced equipment. Five-star hotels accounted for the majority of available AEDs, spine boards, and oxygen cylinders, whereas 3-star properties exhibited complete absence (0%) of AEDs, medical oxygen, and elevated chairs.

This statistical outcome indicates that advanced aquatic safety equipment is currently treated as an optional luxury amenity driven by hotel capital budgets rather than a non-negotiable public health requirement (Giles et al., 2022). Even among 5-star facilities, AED availability reached only 33%, demonstrating that systemic regulatory gaps persist across all hospitality tiers. Relying on paper credential audits rather than physical equipment inspections perpetuates this vulnerability, compromising patron safety across the sector (Schwebel et al., 2021).

5. Conclusion

Recommendations

1- Statutory Code Revisions: Amend municipal and tourism licensing codes to make AEDs, spine boards, and BVM resuscitators mandatory prerequisites for operating commercial swimming pools.

2- Performance-Based Inspections: Transition regulatory enforcement from administrative paper audits to unannounced, physical field inspections evaluating equipment presence and operational status.

3- Targeted Subsidies: Provide tax incentives or equipment subsidies to lower-tier hospitality properties to assist in acquiring advanced resuscitation equipment.

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8. Author Declaration

- The authors confirm originality of work
- The authors confirm no conflicts of interest

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