

Developing a Hazard Analysis and Critical Control Point (HACCP) Framework for Food Safety Management in Buffet Restaurants

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Abstract

This study explored how Hazard Analysis and Critical Control Point (HACCP) is understood, practiced, and maintained in buffet restaurants in Cebu City, aiming to create a sustainable integration framework suitable for high-volume dining settings. Buffet venues encounter unique food safety challenges, including extended food displays, direct customer contact with shared utensils, and quick service turnover, which make HACCP implementation both difficult and essential. A descriptive phenomenological approach was used, involving ten carefully selected participants aged 25–45, with 2–12 years of experience in managerial and operational roles such as managers, chefs, food handlers, and food safety officers. Data analysis followed Colaizzi's seven-step method, revealing six key themes: awareness and understanding, operational practices, training and capacity building, implementation challenges, external influences, and sustainability strategies. Results showed that although participants were aware of and willing to follow HACCP principles, consistent application was hindered by staffing shortages, equipment failures, peak-hour service pressures, and insufficient training systems. In response, the Sustainable HACCP Integration Framework was developed, emphasizing structured training, digital monitoring tools, and the promotion of a robust food safety culture. This framework promotes proactive and sustainable compliance efforts, providing a context-specific contribution to food safety management in buffet restaurant operations.

Keywords: HACCP implementation, buffet restaurants, sustainable food safety, organizational compliance, hospitality management

1. Introduction

Buffet restaurants represent a distinctive sector of the hospitality industry characterized by high customer turnover, diverse menu offerings, and the simultaneous preparation and presentation of multiple dishes. This operational model poses heightened risks to food safety, as the continuous display of food items and customer interaction with shared utensils increase the likelihood of contamination (Awuchi, 2023; NEHA, 2024). The Hazard Analysis and Critical Control Point (HACCP) system, recognized globally as a preventive food safety approach, provides a structured mechanism for identifying and controlling hazards across production and service stages (Ali Eltabey, 2023). Its application within buffet environments, however, presents unique challenges compared to other segments of food service, requiring both technical precision and organizational discipline. In this context, HACCP functions not merely as a regulatory tool but as a cornerstone of consumer protection and operational integrity.

Despite its widespread acknowledgment, the consistent implementation of HACCP in buffet restaurants is hindered by operational pressures, resource constraints, and workforce limitations. Unlike luxury hotels or institutional catering services, buffet establishments in developing urban centers often operate with limited budgets and high staff turnover, factors that weaken compliance with structured safety protocols. These conditions frequently result in documentation lapses, inconsistent monitoring, and reduced capacity to sustain formalized safety measures (Amadu, 2022). Leadership practices and workplace culture further shape outcomes, as the degree to which food safety principles are internalized depends on effective guidance and collective responsibility (Ahsan, 2025). This suggests that technical procedures alone are insufficient without a culture of safety embedded within organizational routines.

Recent studies highlight the importance of context-sensitive approaches to food safety that account for local operational realities rather than relying exclusively on standardized models (Chawla et al., 2025; Ly, 2025). However, the majority of existing research continues to concentrate on high-end hospitality settings, with insufficient attention to mid-scale buffet restaurants where risks may be more pronounced. Moreover, sustainable practices in food safety are increasingly connected to broader themes of waste prevention and social innovation, yet these dimensions remain underexplored in buffet environments (Al-Obadi et al., 2022). The integration of digital monitoring systems and leadership-driven practices offers promising strategies for ensuring long-term adherence, though adoption across buffet operations remains uneven. This gap indicates the need for frameworks that embed sustainability, organizational culture, and technological reinforcement within daily operations.

The Philippine context provides a unique lens for this inquiry, particularly within Cebu City, where buffet dining has become a popular choice among diverse consumer groups. Local establishments face heightened expectations of service quality and customer satisfaction while simultaneously being accountable to regulatory requirements (Basilisco & Jesus, 2024). The pressures of urban dining culture, coupled with limited access to advanced technologies and specialized personnel, complicate the operationalization of HACCP in this setting. These conditions reflect the broader challenges of embedding food safety in developing economies, where customer behaviors and infrastructural constraints intersect with organizational efforts. Situating the study in Cebu City allows for an analysis that captures both the practical and cultural dimensions of HACCP integration.

In response to these challenges, the present study investigates the experiences of managers, chefs, food handlers, and safety officers in buffet restaurants in Cebu City. The study aims to develop a Sustainable HACCP Integration Framework that addresses the operational and cultural dimensions of compliance. Specifically, it integrates structured training programs, digital technologies, and leadership-oriented practices to institutionalize food safety across

buffet operations. By grounding the analysis in lived experiences, the framework provides a practical pathway for ensuring long-term adherence beyond regulatory inspections. Ultimately, the study contributes to the global discourse on HACCP by developing a context-specific model that enhances consumer protection, improves service quality, and promotes sustainability in buffet restaurants.

2. Research Objectives

This study explored the sustainability of HACCP (Hazard Analysis and Critical Control Points) implementation in buffet restaurants within Cebu City, focusing on how food safety protocols were understood, practiced, and maintained in high-demand food service environments. Specifically, this sought to answer the following objectives:

1. Assess staff and management knowledge, attitudes, and application of HACCP in buffet operations;
2. Identify operational and organizational barriers to consistent HACCP compliance during peak service; and
3. Develop a Sustainable HACCP Integration Framework based on the findings of the study.

3. Literature Review

The sustainable integration of Hazard Analysis and Critical Control Points (HACCP) in buffet restaurants can be analyzed through behavioral, organizational, and systems-based perspectives of food safety. Central to this investigation is the Knowledge-Attitude-Practice (KAP) framework, which emphasizes that cognitive awareness, attitudinal disposition, and habitual implementation jointly influence food safety behavior. Employees with higher levels of HACCP knowledge and more positive attitudes toward food safety are more likely to demonstrate consistent compliance, thereby linking individual competency with systemic adherence (Hasan et al., 2022). This framework underscores the necessity of understanding how knowledge and practice converge within the complex environment of buffet service operations.

The significance of knowledge and firsthand experience is further highlighted by evidence suggesting that safe operational behavior is strongly dependent on food workers' comprehension of specific hazards such as allergens (Figueroa-Gómez et al., 2024). Such findings support the objective of evaluating not only the theoretical comprehension but also the practical application of HACCP principles in buffet restaurant environments. These insights suggest that technical information alone is insufficient unless it is absorbed, interpreted, and effectively applied in dynamic service contexts where time pressure, customer interaction, and multitasking are common. Thus, the relationship between awareness and application becomes central to the sustainability of food safety practices in buffet operations.

From an operational perspective, organizational and structural theories explain many of the barriers to consistent HACCP implementation. Food safety practices in catering establishments are often disrupted by systemic constraints such as staff shortages, insufficient training infrastructure, and limited managerial oversight (Smječanin et al., 2023). Similarly, gaps between institutional protocols and human behavior create opportunities for lapses that undermine food safety outcomes, demonstrating that technical measures cannot be divorced from the realities of organizational functioning (Rodríguez & Samaniego-Puertas, 2023; Madilo et al., 2024). These studies illustrate that food safety is shaped by structural limitations as much as by individual practices, emphasizing the need to examine HACCP implementation in contexts where operational pressures are persistent.

The sustainability of HACCP practices is also explained through organizational learning and systems theory. Food safety is most effectively maintained when it becomes embedded within the organizational environment, requiring HACCP integration into regular monitoring and maintenance procedures (Uzoigwe & Kongolo, 2024). This aligns with findings that precursor programs and occupational safety practices strengthen the foundation of sustainable food safety outcomes (Brito et al., 2025). Furthermore, the role of employee trust, organizational commitment, and perceptions of training effectiveness has been shown to mediate behavioral compliance, particularly in high-risk and small-scale food service contexts (Al Mualla, 2022). These insights demonstrate that sustainability is not only technical but also cultural, relying on how organizational systems and human behaviors reinforce one another.

Taken together, these theoretical perspectives highlight the convergence of behavioral, organizational, and systems-based approaches in understanding HACCP integration. However, while existing literature provides valuable insights into food safety practices, the majority of studies have been conducted in catering, hotel, or institutional settings, with limited attention given to buffet restaurants operating in developing urban economies. The unique challenges of prolonged food display, shared customer interactions, and rapid service turnover in buffet environments remain underexplored. Moreover, a limited study has examined how sustainability mechanisms—such as digital monitoring, structured training, and food safety culture—can be embedded into buffet operations. This gap underscores the need for studies that contextualize HACCP integration in buffet restaurants, particularly in regional hubs such as Cebu City, to develop frameworks that ensure not only compliance but also long-term sustainability in food safety management.

4. Methodology

Design

This study employed a qualitative research design guided by Husserlian descriptive phenomenology to examine the lived experiences, perceptions, and practices of individuals engaged in Hazard Analysis and Critical Control Point (HACCP) implementation within buffet restaurant settings in Cebu City. Phenomenology was deemed appropriate because it facilitated the exploration of the essence of participants' experiences and the meanings they attributed to them, extending understanding beyond surface-level accounts. The descriptive approach provided a systematic procedure for extracting significant statements, formulating meanings, and clustering themes into broader categories. Throughout the study, bracketing was applied to minimize researcher bias by consciously setting aside prior assumptions and professional knowledge. This design ensured an in-depth understanding of the organizational, behavioral, and operational dimensions of food safety practices in buffet restaurants.

Environment

This study was conducted in the selected buffet restaurants across Cebu City, Philippines. These establishments were chosen because of their high-volume service and high-risk operational characteristics, which demanded strict adherence to food safety protocols. Site selection was facilitated through professional networks and collaborative arrangements with restaurant operators, ensuring access to establishments that embodied diverse managerial systems and operational structures. Variation in restaurant size, customer turnover, and service procedures was intentionally considered to capture operational heterogeneity. Such diversity strengthened the transferability of findings by ensuring that the insights derived from this study could be meaningfully applied to buffet operations beyond the immediate research context.

Key Informants & Sampling

The study engaged ten participants directly involved in food safety operations within buffet restaurants, representing diverse organizational roles such as managers, owners, head chefs,

kitchen supervisors, buffet attendants, food handlers, and quality assurance officers. Purposive sampling was employed to ensure the inclusion of participants with substantial and relevant experience in HACCP implementation. Eligibility criteria required at least six months of direct involvement with HACCP-related responsibilities, which enabled the study to capture both strategic insights from management and practical perspectives from frontline staff. Demographically, participants ranged from 25 to 45 years of age, with service tenures spanning two to twelve years. The group comprised both male and female informants, ensuring representation across managerial and operational levels of buffet restaurant operations. The final sample size of ten was deemed sufficient because thematic saturation was reached at the tenth interview, when no new codes or categories emerged, consistent with the methodological guidance of Guest et al. (2006). This diversity of roles and experiences provided a comprehensive view of HACCP implementation, highlighting both shared challenges and role-specific perspectives.

Data Analysis

The study employed Colaizzi's seven-step descriptive phenomenological method (Colaizzi, 1978) to analyze the interview data. The process began with repeated readings of transcripts to establish familiarity and to capture the breadth of participants' narratives. Significant statements related to HACCP practices were identified verbatim, after which formulated meanings were derived while preserving fidelity to participants' expressions. These meanings were systematically organized into theme clusters and compared across transcripts to ensure coherence. The clustered themes were then synthesized into an exhaustive description that captured the collective experiences of the participants. From this synthesis, the essential structure of sustainable HACCP implementation in buffet restaurants was articulated. To enhance trustworthiness, member checking was conducted with selected participants to validate accuracy and resonance with their experiences. Additional rigor was ensured through peer debriefing with qualitative research experts, as well as the maintenance of reflective journals that documented analytic decisions and researcher reflexivity throughout the study. These strategies strengthened the credibility, dependability, confirmability, and transferability of the findings.

Ethical Considerations

This study was conducted in accordance with established ethical principles, including respect for autonomy, informed consent, confidentiality, and beneficence. All participants were thoroughly informed of the objectives and scope of the research before data collection, and written consent was voluntarily provided by each individual. Anonymity was preserved through the assignment of pseudonyms, and all transcripts, recordings, and related documents were stored in password-protected digital files accessible only to the research team. The rights and welfare of participants were safeguarded by ensuring that their involvement was voluntary and that they could withdraw from the study at any point without consequence. Ethical clearance was secured from the Institutional Review Board of the University of Southern Philippines Foundation before the commencement of the investigation, confirming compliance with institutional and academic research standards.

5. Results and Discussion

This study involved ten participants from buffet restaurants in Cebu City who provided detailed accounts of HACCP implementation. The participants included restaurant managers, owners, head chefs, kitchen supervisors, buffet attendants, food handlers, and quality assurance officers. They represented both managerial and operational perspectives, allowing for a comprehensive understanding of practices and challenges in food safety. The demographic profile reflected

variation in age, gender, position, and years of service, thereby offering diverse viewpoints that contributed to data richness.

Demographic Profile of Participants

The study involved ten key informants representing diverse roles in buffet restaurant operations in Cebu City, including managers, head chefs, kitchen supervisors, food handlers, and quality assurance officers. Participants varied in age, gender, and years of service, allowing for a balanced perspective from both strategic and operational levels of HACCP implementation. The demographic characteristics are summarized in Table 1.

| Informant | Age Range | Gender | Position/Role | Years of Service |
|-----------|-----------|--------|---------------------------|------------------|
| 1 | 25–30 | Male | Food Handler | 2 |
| 2 | 31–35 | Female | Kitchen Supervisor | 5 |
| 3 | 26–30 | Male | Buffet Attendant | 3 |
| 4 | 36–40 | Female | Restaurant Manager | 8 |
| 5 | 41–45 | Male | Head Chef | 12 |
| 6 | 30–35 | Female | Quality Assurance Officer | 6 |
| 7 | 28–32 | Male | Food Handler | 4 |
| 8 | 33–37 | Female | Kitchen Supervisor | 7 |
| 9 | 29–34 | Male | Buffet Attendant | 3 |
| 10 | 38–42 | Female | Restaurant Owner/Manager | 10 |

Most participants were in their late twenties to early forties, with a mix of male and female respondents. The group included both frontline workers, such as food handlers and buffet attendants, as well as supervisory and managerial staff. Years of service ranged from 2 to 12, with an average of approximately 6 years, ensuring that informants had substantial experience with food safety operations. This demographic diversity provided a comprehensive view of HACCP implementation across different organizational levels in buffet restaurants.

Theme 1: Awareness and understanding of HACCP

Participants consistently described HACCP as a proactive food safety system intended to prevent contamination in buffet environments. They emphasized that awareness was developed through both formal training and direct work experience. HACCP was understood not merely as a compliance requirement but as a structured method for minimizing risks in high-volume, high-risk food service operations.

Sub-theme 1: Basic Knowledge and Definition of HACCP. Participants consistently demonstrated a clear understanding of HACCP as a structured food safety system designed to prevent hazards across the stages of food preparation and service. Informants explained that HACCP was more than a set of cleanliness rules, but rather a proactive and systematic method for identifying and managing risks before they could escalate into problems. One participant emphasized, “*HACCP is more than just cleaning or using gloves—it is a step-by-step method to prevent contamination. It helps us control risks before they become problems.*” Another informant added, “*We follow HACCP because it gives us a guide to make sure food is safe from the time we prepare it until it is served.*” A third participant reinforced this view, stating, “*HACCP helps us think ahead. Instead of waiting for issues, we already know what to check to keep the food safe.*” These responses highlight that buffet restaurant workers in Cebu City perceived HACCP as a preventive framework rather than a compliance requirement. This finding is consistent with research noting that employees who receive formal HACCP training tend to apply it as a strategic tool for risk management rather than a series of routine hygiene

tasks (Oniye, 2024; Jesus et al., 2024). Similarly, studies have shown that insufficient conceptual knowledge of HACCP often leads to fragmented and inconsistent procedures in the hospitality industry (Diaz De Oleo, 2023). The proactive acceptance of HACCP by Cebu City buffet employees, therefore, provides a foundation for long-term food safety practices in high-volume and high-risk environments.

Sub-theme 2: Personal Exposure and Initial Learning Experiences. Participants explained that their first exposure to HACCP often occurred through formal training sessions mandated by local government agencies or during food safety seminars connected with business permit renewals. These initial experiences were described as critical in shaping current practices and awareness of food safety standards, particularly in buffet environments where food remains on display for extended periods. One informant recalled, *“I first learned about HACCP during a business permit renewal seminar. It opened my eyes to how important food safety is, especially for buffets where food stays out for long periods.”* Another participant echoed this, stating, *“When we attended the LGU training, I realized HACCP was not just for paperwork but for daily work in the kitchen.”* A third informant emphasized, *“Government seminars made me understand that HACCP is not optional—it is something that keeps customers safe every day.”* These responses reflect how mandatory regulatory training significantly influenced the way buffet employees internalized food safety practices. This observation is consistent with studies highlighting the contribution of regulatory programs to raising service standards in food service operations (Basilisco and Jesus, 2024). Early exposure has also been shown to foster long-term adherence to safety protocols (Lynch, 2010), while structured training environments encourage stronger compliance with food safety procedures in practical settings (Peter et al., 2023).

Sub-theme 3: Assigned Roles and Shared Responsibility in Implementation. Participants emphasized that although the formal responsibility for HACCP compliance was usually attributed to management or designated food safety officers, its effective implementation depended on the collective accountability of all staff members. They explained that supervisors provided leadership, but daily compliance was only sustained through cooperation across roles, from kitchen staff to buffet attendants. One informant stated, *“Our supervisor leads, but everyone does their part. We clean, label, and monitor temps. It is teamwork. If one person forgets, another reminds—we all contribute to food safety.”* Another participant noted, *“Even if the manager checks everything, it will not work unless we in the kitchen do our part every day.”* A third informant added, *“Food safety is everybody’s job here. From the one preparing food to the one serving it, we are all expected to follow HACCP.”* These statements underscore the shared responsibility mindset that buffet teams in Cebu City have developed, which ensures that compliance is not dependent on a single authority but reinforced by the group. This finding reflects the view that clearly defined roles and active staff participation are critical to the effectiveness of food safety systems (NEHA, 2024). It also aligns with the argument that collective commitment and leadership modeling strengthen food safety culture and ensure that HACCP practices are sustained in organizational settings (Pai et al., 2024).

Theme 2: Operational HACCP Practices

Operational HACCP practices were consistently observed among buffet restaurant staff, reflecting structured and standardized approaches to food safety management. Participants described the systematic application of temperature monitoring, food labeling, sanitation routines, and clearly defined preparation protocols as integral to daily operations. These practices were reinforced through scheduled inspections, team coordination, and management oversight, which collectively ensured accountability and reduced the likelihood of contamination. Staff emphasized that compliance was not only procedural but also habitual,

embedded in their workflow to address the high demands of buffet service. The consistency of these measures demonstrated a strong organizational commitment to safeguarding food quality and minimizing risks in high-volume environments where food is exposed for extended periods.

Sub-theme 1: Temperature Checks, Labeling, and FIFO Systems. Participants highlighted that temperature monitoring, systematic labeling, and the consistent application of FIFO (First-In, First-Out) were fundamental to HACCP compliance in buffet restaurant operations. They described conducting temperature checks at regular intervals during storage, cooking, and buffet service, with results recorded either in manual log sheets or digital monitoring systems. One informant explained, *“We check food temperatures every two hours, especially on the buffet line. Hot food must stay above 60°C. Everything is labeled with the date and time—no shortcuts.”* Another participant added, *“FIFO is part of our daily practice because it makes sure old stocks are used first and nothing gets wasted.”* A third informant emphasized, *“If food is not labeled correctly, we cannot serve it, since labels are proof that everything is monitored and safe.”* These accounts illustrate how traceability and accountability were embedded in routine operations, minimizing the risk of spoilage and contamination. This emphasis on structured monitoring aligns with research that highlights the value of traceability systems—whether digital or manual—in maintaining integrity and real-time visibility of food safety processes (Yele and Litoriya, 2024). Similarly, FIFO systems have been shown to reduce food waste, improve inventory management, and reinforce sustainability in food service operations (Al-Obadi et al., 2022).

Sub-theme 2: Sanitation, Hygiene, and PPE Use. Participants emphasized that sanitation practices, personal hygiene, and the use of protective equipment were essential in maintaining HACCP compliance within buffet restaurant operations. They described these measures as routine and embedded in their daily activities, reinforced through team briefings and operational protocols. One participant explained, *“We have designated handwashing stations, and everyone wears complete PPE. It has become second nature to sanitize our prep tables and change gloves between tasks.”* Another informant noted, *“Wearing gloves, hairnets, and aprons is part of our work—if we forget, our supervisor immediately reminds us.”* A third participant added, *“Handwashing is something we all do automatically now; it is as important as cooking the food itself.”* These statements highlight that staff internalized hygiene as both an individual responsibility and a collective norm. Such practices reflect evidence that sanitation routines not only strengthen food safety systems but also improve efficiency and reduce operational risks (Hasbi et al., 2024). In addition, maintaining hygiene standards has been recognized as a crucial factor in preventing foodborne illnesses and protecting consumer health in high-risk environments (Kumar et al., 2024).

Sub-theme 3: Storage, Preparation, and Buffet Line Protocols. Participants described that food storage, preparation, and buffet service were governed by well-structured protocols designed to minimize cross-contamination and uphold HACCP standards. They explained that raw ingredients were consistently separated from cooked items, with the use of color-coded bins and chopping boards to maintain clarity and safety during preparation. One informant shared, *“We use different prep areas for raw and cooked food, and the buffet trays are swapped out every two hours. We brief the team before service so everyone knows the plan.”* Another participant added, *“Color-coded boards and bins make it easier for us to avoid mistakes, especially when we are rushing.”* A third informant noted, *“Hot and cold food must always stay within the right temperature range, so we replace trays regularly to keep food safe.”* These reflections illustrate that compliance was ensured through preventive segregation, strict time-temperature monitoring, and structured team coordination. Such practices are consistent with research emphasizing that transparent and traceable handling systems strengthen food safety in

large-scale food service environments (Yele and Litoriya, 2024). Furthermore, operational discipline has been identified as increasingly important in adapting food safety protocols to evolving culinary trends, particularly in buffet settings where risks are heightened (Yıkıncı et al., 2024).

Theme 3: Training and Capacity Building

Training and capacity building were regarded by participants as essential in sustaining HACCP implementation, particularly through regular, practical, and context-specific learning sessions. They noted that structured training improved awareness and confidence, yet inconsistencies in frequency and delivery created gaps that could weaken long-term compliance.

Sub-theme 1: Frequency and Forms of HACCP Training. Participants reported exposure to HACCP training through certification programs, internal workshops, and briefings facilitated by local government agencies or private organizations, yet the frequency of these sessions varied considerably across establishments. Some restaurants offered structured training on a biannual or quarterly basis, while others relied primarily on informal coaching during staff meetings, which often led to inconsistencies in knowledge retention. One informant explained, *“We attend HACCP seminars every year, and the kitchen team gets internal refreshers. But sometimes we only get formal training when there is a new policy or during permit renewals.”* Another participant shared, *“Some of us only get short reminders in meetings, and it is not the same as real training.”* A third added, *“Training is not regular in every place, and that makes it difficult to follow HACCP correctly all the time.”* These accounts reveal that irregular training undermines sustainability, supporting evidence that consistent, structured learning is essential for strengthening organizational performance (Saputra et al., 2024) and that lapses in protocol often arise in fast-paced environments when training is inconsistent (Dijkstra & de Roda Husman, 2023).

Sub-theme 2: Orientation for New Staff and Refresher Sessions. Participants highlighted that orientation for new staff and periodic refresher sessions were crucial for embedding HACCP principles and ensuring consistent compliance. They explained that practical demonstrations and on-site coaching during the early stages of employment helped new workers quickly adopt correct food safety practices, while refresher sessions reinforced standards among experienced staff. One informant shared, *“New staff are trained before they start working in the kitchen. We walk them through HACCP basics—like how to label food, log temperatures, and avoid cross-contamination.”* Another participant stated, *“Orientation helps us learn faster because we practice immediately with the team.”* A third added, *“Refresher training keeps everyone alert, especially when people forget or get used to shortcuts.”* These accounts illustrate how continuous reinforcement fosters compliance, which aligns with research showing that early orientation strongly influences food handling behavior (Kingston, 2023) and that structured refresher sessions improve knowledge retention and strengthen organizational safety culture (Pilbeam and Karanikas, 2023).

Sub-theme 3: Perceived Effectiveness and Gaps in Training Delivery. Participants acknowledged that HACCP training was valuable but raised concerns about its effectiveness in high-pressure buffet environments where speed and multitasking were constant demands. They pointed out that information retention was often limited, and without hands-on practice, the training did not always translate into consistent application. One informant explained, *“Sometimes we forget steps when it gets busy. Reading manuals is different from actually doing it during a rush. I think hands-on training would help more than lectures.”* Another participant stated, *“When we only listen to lectures, it is easy to forget, but when we practice, we remember.”* A third informant added, *“Training is good, but it should match the real situations we face every day.”* These reflections indicate that while training was seen as essential, its long-

term impact depended on context-specific, practical, and interactive approaches. This is consistent with research emphasizing that adaptive instructional design models enhance training effectiveness in dynamic work environments (Cotter et al., 2023; Jesus et al., 2025c) and that experiential, hands-on learning significantly improves retention and performance in high-pressure food service operations (Doerner & Horst, 2022).

Theme 4: Challenges in Implementation

Participants identified several barriers that hindered the consistent application of HACCP protocols in buffet restaurants. High service demand during peak hours and limited staffing often forced workers to prioritize speed over accuracy, leading to lapses in monitoring and recordkeeping. Equipment failures, such as malfunctioning thermometers or heating trays, further undermined compliance by requiring improvisation and increasing the risk of violations. These challenges highlighted the vulnerability of food safety practices to operational pressures, emphasizing the need for adequate staffing, reliable infrastructure, and streamlined monitoring systems to sustain HACCP adherence in high-volume service environments.

Sub-theme 1: Pressure During Peak Hours and Staffing Issues. Participants consistently identified peak service hours and staffing shortages as significant barriers to the consistent implementation of HACCP in buffet operations. They explained that heavy customer demand during lunch and dinner periods or large group events often forced them to prioritize speed over documentation and monitoring, resulting in missed logs or skipped safety procedures. One informant shared, “During dinner rush, it’s really hard to do everything. We’re rushing to refill trays, and sometimes we forget to log the temps or clean between tasks. Especially if someone’s absent.” Another participant added, “When the kitchen is full and customers keep coming, it is impossible to follow every HACCP step exactly.” A third explained, “If one staff member is missing, the rest of us double up on work, and safety checks are the first to be forgotten.” These reflections emphasize that operational pressure and limited staffing compromise compliance, reinforcing findings that identifying logistical control points helps mitigate food safety risks in busy environments (Johansson, 2023) and that workforce availability and workflow organization directly affect HACCP effectiveness in food service operations (Radu et al., 2023).

Sub-theme 2: Incomplete Documentation and Monitoring Lapses. Participants reported that incomplete documentation and monitoring lapses were common during peak service periods when staff were overwhelmed by competing tasks such as serving, cleaning, and food replenishment. They explained that under such conditions, temperature checks and sanitation records were often skipped or delayed, compromising HACCP compliance. One informant admitted, “During dinner rush, it is really hard to do everything. We are rushing to refill trays, and sometimes we forget to log the temps or clean between tasks.” Another participant shared, “When the line is long, we focus on customers first, and the record-keeping is left behind.” A third explained, “If things get too busy, the paperwork is the first to be set aside, even if we know it is important.” These reflections demonstrate how operational pressure undermined routine monitoring, supporting findings that documentation gaps remain a key barrier to HACCP adoption in the absence of integrated systems and real-time accountability (Dima et al., 2024) and that food safety standards are only effective when records are maintained consistently and accurately (Walsh, 2022).

Sub-theme 3: Equipment Failures and Physical Limitations. Participants reported that malfunctioning thermometers, broken chillers, and faulty heating trays posed serious challenges to maintaining HACCP compliance in buffet operations. They explained that limited access to replacement tools or delays in maintenance often forced them to improvise, which

heightened the risk of food safety violations. One informant shared, “One time, our hot tray broke down, and the food was not kept warm enough. We did not notice right away until a guest complained. We had to throw it out and replace it fast.” Another participant explained, “If a thermometer is not working, we just guess the temperature, which is not accurate but sometimes unavoidable.” A third added, “Broken equipment slows us down, and we cannot always wait for repairs, so we adjust the process.” These accounts illustrate how equipment reliability directly influenced staff capacity to uphold food safety standards, reflecting findings that effective control requires not only training but also dependable infrastructure (Sameen et al., 2023) and that well-functioning equipment and timely maintenance are essential to sustaining hygiene and safety standards (Okpala & Korzeniowska, 2023).

Theme 5: External Influences on Food Safety

External factors were identified as having a strong influence on the consistency of HACCP implementation in buffet operations. Customer behavior introduced risks that staff could not always control, such as improper handling of utensils or direct contact with food, which created vulnerabilities despite preventive measures. In contrast, visible leadership involvement reinforced compliance by modeling safe practices and maintaining accountability, while government-led training and inspections provided the regulatory foundation for awareness and baseline adherence. These findings indicate that external influences can either weaken or strengthen HACCP practices, with sustainability depending on the balance between customer cooperation, managerial commitment, and supportive policy interventions.

Sub-theme 1: Customer Behavior at the Buffet Line. Participants explained that customer behavior often undermined HACCP compliance, as guests were observed touching food directly, mixing utensils between dishes, or returning used plates to the buffet line despite visible signage and reminders from staff. These actions were described as difficult to control without negatively affecting the guest experience and created persistent risks of contamination in buffet service. One informant noted, “*Some guests ignore the tongs and use their hands. Others open the food covers and do not close them. We remind them, but we cannot watch every customer all the time.*” Another participant shared, “*Even when signs are posted, some customers still mix serving spoons between dishes.*” A third explained, “*Guests sometimes return plates with leftover food, and we have to remove the whole tray to be safe.*” These reflections highlight how customer behavior functioned as an external variable beyond staff control, reinforcing findings that buffet environments can trigger impulsive guest actions that require design-based interventions (Greene et al., 2024) and that environmental cues and ritual-based routines can reduce non-compliant behaviors in restaurant settings (Cozzio & Furlan, 2023).

Sub-theme 2: Management and Leadership Involvement. Participants highlighted that visible management engagement was crucial in sustaining HACCP compliance, as supervisors and owners who actively monitored practices, provided feedback, and modeled correct behavior fostered stronger adherence to food safety protocols. They explained that when leadership consistently emphasized food safety, employees were more motivated to comply, reinforcing a culture of accountability throughout the organization. One informant stated, “*If management shows they’re serious about food safety, we follow. When they do surprise checks and ask for updates, it reminds us to stay alert.*” Another participant explained, “*When the owner joins inspections, we know food safety is a priority, not just a formality.*” A third added, “*Leaders who talk about food safety in meetings and remind us daily make it part of our routine.*” These reflections confirm that leadership involvement directly shapes organizational culture and compliance, consistent with findings that strategic leadership strengthens food safety systems when aligned with quality management principles (Fadhel & Alqurs, 2025;

Jesus et al., 2025a) and that ethical leadership fosters positive employee behavior by building a strong safety climate (Amadu, 2022).

Sub-theme 3: Government and Policy-Level Support. Participants emphasized that government-mandated training and inspections were essential in establishing baseline HACCP awareness and compliance within buffet restaurants, yet they expressed the need for support that was better tailored to the realities of buffet operations. They explained that while seminars and inspections provided valuable information, much of the content was designed for canteens or hotel restaurants rather than high-volume buffet environments. One informant noted, “The city health office gave us a good seminar, but most examples were for small canteens or hotels. Buffet setups have different risks. It would help if the training matched our environment better.” Another participant shared, “Government inspections remind us to stay compliant, but we need guidelines that fit the buffet style.” A third added, “Support from agencies is good, but more workshops for buffet staff would help us apply HACCP properly.” These reflections highlight that while government initiatives promote compliance, long-term sustainability requires sector-specific approaches, consistent with findings that generic HACCP frameworks often fail to address the logistics of high-volume food service environments (Johansson, 2023) and that localized policy interventions strengthen food safety culture through collaborative engagement (Pai et al., 2024).

Theme 6: Sustaining HACCP Compliance

Sustaining HACCP compliance was described by participants as dependent on strategies that made food safety practices easier to implement and more resilient under pressure. Simplified tools such as checklists and visual reminders helped staff maintain consistency during peak hours, while the integration of digital technologies improved accuracy and reduced reliance on manual monitoring. Equally important was the establishment of a collaborative work culture where accountability and peer support reinforced compliance as a shared responsibility. Together, these approaches allowed buffet operations to uphold HACCP standards despite operational challenges, demonstrating that sustainability requires a balance of practical tools, technological innovation, and organizational commitment.

Sub-theme 1: Simplifying Processes Through Visual Aids and Checklists. Participants highlighted that simplifying HACCP procedures through visual aids and checklists was essential for ensuring consistent compliance, particularly among line staff and new employees who faced fast-paced work conditions. They explained that illustrated posters and simplified forms reduced confusion and supported quick decision-making during service hours. One informant stated, “Too many words on the forms confuse us. But checklists or pictures posted near the station help us remember what to do, especially when we are rushing.” Another participant shared, “Visual reminders make it easier to follow steps compared to long manuals.” A third added, “When posters are placed near the work area, we do not forget important food safety steps.” These reflections illustrate that user-friendly tools helped reduce cognitive overload and encouraged routine compliance, consistent with findings that visual resources improve food hygiene competency (Suroño, 2024) and that simplified documentation and clearly defined processes are critical for sustaining food safety systems in operational environments (Awuchi, 2023).

Sub-theme 2: Integration of Digital Tools and Automation. Participants identified digital tools and automation as important enablers of more efficient HACCP implementation, particularly in reducing errors and saving time during peak service hours. They explained that technologies such as smart thermometers and mobile logging applications could improve accuracy and support real-time monitoring of food safety tasks. One informant noted, “If we had a thermometer that beeps when food gets too cold or an app to track time, it would make

things easier. Manual logs are easy to forget when we are busy.” Another participant shared, “Digital apps would help us track everything faster compared to writing it down.” A third explained, “Smart tools reduce mistakes because they remind us automatically.” These reflections illustrate the potential of technology to enhance accountability and streamline documentation, supporting evidence that digital solutions strengthen real-time food safety monitoring (Eltabey, 2023) and that digitalization in food service operations improves efficiency in complex, high-volume environments (Mitchell, 2025).

Sub-theme 3: Building a Culture of Accountability and Teamwork. Participants emphasized that sustaining HACCP compliance relied heavily on fostering a culture of accountability and teamwork, where food safety was regarded as a shared responsibility across all roles. They described the importance of peer reminders, role clarity, and inclusive participation in safety discussions as strategies that encouraged consistent adherence to protocols. One informant explained, “If one person forgets, the other reminds them. We help each other. When everyone feels responsible, we do not miss the steps—even during rush hours.” Another participant stated, “We remind each other in the kitchen because teamwork makes it easier to follow HACCP.” A third added, “When managers appreciate our efforts, we feel more motivated to comply with safety rules.” These reflections demonstrate that cooperation, recognition, and collective responsibility played a pivotal role in embedding HACCP into daily practice, consistent with findings that mutual reinforcement and group ownership underpin strong food safety cultures in SMEs (Kabiesz, 2024) and that leadership support fosters teamwork and continuous improvement in performance (Ahsan, 2025; Jesus et al., 2025b).

Framework Generated

The study developed a framework illustrating how the interconnected pillars of Structured Training and Capacity Building, Real-Time Monitoring and Digital Documentation, and Organizational Commitment and Food Safety Culture collectively sustain the effective implementation of HACCP in buffet restaurant operations. These pillars emphasize the synergy between workforce competency, technological monitoring, and institutional culture in ensuring long-term food safety compliance and sustainability.



Figure 1: Sustainable HACCP Integration Framework

The framework illustrates that the sustainability of HACCP does not rely on individual practices but on the synergy of training, monitoring, and culture. Structured training ensures knowledge retention and practical competence; digital monitoring systems reduce human error and enhance accountability; and organizational commitment fosters a culture of safety that normalizes HACCP as part of everyday operations. These elements, when combined, create a reinforcing cycle that institutionalizes food safety within buffet restaurants.

Practical Application

The framework offers buffet restaurants a strategic pathway to achieve long-term HACCP sustainability. In practice, this can be applied by:

1. **Structured Training and Capacity Building.** Implement modular training programs with onboarding sessions for new staff, use visual job aids for daily reinforcement, and conduct regular refresher courses tailored to buffet operations.
2. **Real-Time Monitoring and Digital Documentation.** Adopt smart thermometers, mobile logging applications, and timestamped checklists to streamline monitoring. Weekly data verification ensures traceability and accountability.
3. **Organizational Commitment and Food Safety Culture.** Encourage visible leadership engagement, integrate food safety into daily briefings, promote peer accountability, and establish recognition systems for consistent compliance.

By operationalizing these three pillars, buffet restaurants can move beyond compliance-oriented audits toward a proactive and sustainable system that embeds food safety into organizational culture.

6. Discussion

This study examined the sustainability of Hazard Analysis and Critical Control Points (HACCP) implementation in buffet restaurants in Cebu City, focusing on how food safety protocols are understood, practiced, and sustained in dynamic service environments. Insights drawn from managers, chefs, food handlers, and food safety officers revealed enabling factors as well as systemic barriers to compliance. While baseline awareness of HACCP principles was evident, operational challenges—such as staffing shortages, equipment malfunctions, peak service pressures, and inadequate training systems—often compromised consistent application. Similar findings have been observed in catering and institutional settings, where limited infrastructure and workforce instability hindered sustained compliance with HACCP guidelines. External influences, including inconsistent customer behavior and insufficiently contextualized regulatory guidance, further complicated implementation, supporting prior research that emphasized the importance of context-sensitive approaches to food safety. These results indicate that effective HACCP integration requires a systems-based perspective that combines organizational, technological, and behavioral dimensions.

In response to these challenges, this study developed the Sustainable HACCP Integration Framework, which consolidates three interdependent domains: organizational commitment and food safety culture, real-time monitoring and digital documentation, and structured training and capacity building. Collectively, these pillars address knowledge deficits, procedural inconsistencies, and cultural barriers, thereby offering a comprehensive mechanism for institutionalizing food safety practices. The emphasis on food safety culture reflects broader arguments that sustainable compliance is only possible when organizational values and employee behaviors are aligned with technical systems. Similarly, the integration of digital monitoring corresponds with calls for leveraging technological innovations to minimize human error and strengthen accountability. Its practical implications are multifaceted: for operators, embedding HACCP into daily routines requires user-friendly digital tools and simplified

protocols; for regulators and educators, the findings reinforce the necessity of tailoring training programs and policy guidelines to buffet-specific risks. Overall, this study advances the discourse on HACCP by reframing compliance as a proactive, resilient, and team-oriented practice that is particularly suited to the complexities of high-volume restaurant operations.

7. Conclusion

The sustainable implementation of HACCP in buffet restaurants emerges as a complex process influenced by operational, organizational, and behavioral factors. Evidence from diverse operational and managerial staff demonstrated both the potential and the limitations of embedding food safety practices in high-turnover environments. While baseline awareness of HACCP principles was observed, its application was undermined by infrastructural gaps, service pressures, and inconsistent practices among staff and customers. These findings affirm the need to transition from episodic compliance checks to adaptive, integrated systems that embed food safety within daily routines and organizational culture. The proposed Sustainable HACCP Integration Framework addresses this need by combining structured training, digital monitoring, and a leadership-driven culture. Its adaptability to high-volume contexts enhances organizational resilience while safeguarding public health. Importantly, this framework contributes theoretically by bridging behavioral, organizational, and systems-based perspectives, demonstrating that sustainable food safety requires both technical rigor and cultural reinforcement. The Cebu City context provides empirical insights into developing economies where infrastructural constraints and customer behaviors intersect with regulatory enforcement. Ultimately, the long-term success of HACCP depends not only on regulatory oversight but also on the collective capacity of organizations to institutionalize preventive action, accountability, and continuous improvement in food safety management.

8. Recommendations

To strengthen the sustainable integration of HACCP in buffet restaurant operations, several interrelated strategies are recommended. Restaurants should institutionalize structured training programs by providing onboarding modules for new employees and periodic refresher sessions that employ scenario-based and practical approaches tailored to the unique pressures of buffet environments. The adoption of digital tools such as smart thermometers, mobile logging applications, and real-time monitoring systems must be prioritized to minimize human error, streamline documentation, and reinforce accountability during peak service hours. Equally important is the role of managerial leadership, which should be demonstrated through active supervision, visible role modeling, and recognition of compliant staff behavior to cultivate a strong organizational food safety culture. HACCP protocols should also be simplified and operationalized using visual job aids, illustrated checklists, and infographics to enhance clarity and accessibility, particularly for new or rotating staff. At the policy level, stronger collaboration with government agencies and regulators is necessary to co-develop buffet-specific HACCP guidelines, deliver localized training, and provide incentives for establishments that consistently uphold high compliance standards. Finally, customer-related risks can be mitigated through targeted interventions such as clear signage, utensil-use reminders, and supervised service practices to prevent contamination arising from improper guest interactions. Collectively, these strategies facilitate a transition from audit-centered compliance toward a proactive, resilient, and sustainable model of HACCP implementation that safeguards food safety and strengthens consumer confidence.

9. Limitations of the Study

Although this study provides valuable insights into HACCP implementation in buffet restaurants, several limitations must be acknowledged. First, the geographic scope was

confined to Cebu City, which may restrict the generalizability of findings to other regions with different regulatory and cultural contexts. Second, while thematic saturation was achieved with ten purposively selected participants, the relatively small sample excluded perspectives from additional stakeholders such as part-time employees, inspectors, and customers, whose practices directly influence HACCP outcomes. Third, the qualitative and self-reported nature of the data presents inherent limitations, as contamination rates and incidence of foodborne illness were not empirically measured. Reliance on participant accounts may have introduced biases, including selective recall and social desirability. Fourth, the study was conducted before the widespread adoption of advanced digital technologies, which may reshape HACCP practices in future operational contexts. Future research should address these limitations by expanding samples to include customer and regulator perspectives, employing mixed-method or quantitative designs to validate the framework empirically, and conducting comparative studies across multiple cities or countries. Studies exploring the role of advanced digital technologies—such as artificial intelligence-enabled monitoring and predictive analytics—could also strengthen understanding of how innovation contributes to sustainable HACCP integration. Such directions would extend the current framework and ensure its continued relevance in a rapidly evolving food service landscape.

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