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Implementation Assessment of the Eat Right Campus Policy in a Tertiary Care Healthcare Institution in North India: A Descriptive Cross-Sectional Mixed-Methods Study

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ABSTRACT

Background: Institutional food environments in tertiary healthcare settings pose risks to vulnerable populations. India's Eat Right Campus (ERC) initiative promotes hygiene, nutrition, and sustainability, yet evidence of implementation remains limited. **Objectives:** To assess ERC implementation status and identify determinants of compliance in a tertiary care institution. **Methods:** A six-month descriptive cross-sectional mixed-methods study audited all 30 registered food outlets using the FSSAI Hygiene Rating Checklist. Food-handler knowledge, attitudes and practices (KAP) were assessed via a questionnaire adapted from the WHO Five Keys to Safer Food Manual. Focus group discussions and in-depth interviews were thematically analyzed and synthesised through a SWOT framework. **Results:** All outlets met minimum standards; 13.3% achieved Good/Very Good ratings, 60.0% were Fair, and 26.7% required improvement. Documentation and monitoring were weakest. Positive attitudes coexisted with lower knowledge; compliance was largely enforcement-driven. **Conclusion:** ERC implementation achieved foundational compliance but revealed gaps in documentation, monitoring and food-handler knowledge, highlighting the need for continuous training and strengthened oversight.

Keywords: Eat Right Campus; Food safety; Hygiene audit; Food handlers; Knowledge, attitude and practice; FSSAI; Tertiary healthcare institution; Mixed-methods; Policy implementation; SWOT analysis.

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Introduction

Foodborne disease remains a major global public-health challenge, affecting an estimated 600 million people and causing approximately 420,000 deaths each year.[1] Institutional food environments, particularly within tertiary healthcare settings, warrant special attention because they serve vulnerable populations including **immunocompromised** patients, older adults and individuals with chronic illnesses. In these settings, food-safety failures may contribute to healthcare-associated infections, prolonged hospital stays, increased treatment costs and adverse patient outcomes.[2, 3]

In India, the Food Safety and Standards Act, 2006 marked a significant reform by consolidating multiple food-related laws into a unified regulatory framework.[4] The subsequent establishment of the Food Safety and Standards Authority of India (FSSAI) strengthened food-safety governance through licensing, inspections, hygiene rating systems and structured training programmes,

while progressively promoting preventive and risk-based approaches to food-safety management.[5] Building on this framework, the Eat Right Campus (ERC) initiative, launched under the Eat Right India movement, seeks to promote safe, healthy and sustainable food environments within institutional settings. The initiative extends beyond regulatory compliance to encompass food hygiene, nutrition promotion, safe drinking water, waste management and environmental sustainability.[6] ERC certification requires adherence to Schedule 4 hygiene standards, training of food handlers through the Food Safety Training and Certification (FoSTaC) programme, and the display of hygiene ratings. By early 2024, more than 500 hospitals and 2,900 workplaces across India had received ERC certification.[7]

Despite the rapid expansion of the ERC initiative, implementation across institutions is often heterogeneous. Successful implementation depends on multiple factors, including infrastructure adequacy, administrative commitment, resource availability, economic feasibility and stakeholder engagement.[8–10] Regulatory governance research suggests that, although routine inspections can improve baseline compliance, they may be insufficient to foster a sustained culture of food safety. Long-term improvements require **organisational** leadership, behavioural reinforcement, continuous monitoring and institutional accountability.[11,12] Furthermore, studies from North India have reported deficiencies in the knowledge, attitudes and practices of hospital food handlers, many of which improved following structured educational interventions.[13,14] These findings highlight the importance of examining how food-safety knowledge and behaviours are reinforced within institutional policy frameworks. Despite the growing adoption of ERC certification, published peer-reviewed evidence specifically evaluating the implementation of the ERC framework within certified tertiary healthcare institutions remains sparse, representing an important evidence gap given the expanding scale of the programme nationwide.

Mixed-methods policy evaluation provides a robust approach for examining both measurable compliance outcomes and the contextual factors influencing implementation.[15,16] Quantitative audits alone reveal structural adherence to regulatory benchmarks but cannot illuminate why non-compliance persists or which contextual factors enable or inhibit sustained policy uptake. Conversely, qualitative inquiry alone captures stakeholder perspectives and lived implementation experience but lacks measurable benchmarks against which policy fidelity can be quantified. A convergent mixed-methods design integrates both arms at the interpretation phase, producing triangulated evidence in which observable compliance is **contextualised** by the mechanisms generating it. This is particularly valuable for policy-implementation research, where structural compliance and behavioural embedding may diverge.

The present study was therefore undertaken to: (i) assess hygiene compliance across all registered food outlets within a tertiary healthcare institution and evaluate the knowledge, attitudes and practices of food handlers regarding food safety and hygiene; (ii) explore stakeholder perceptions of barriers and facilitators influencing ERC implementation; and (iii) **synthesise** the findings within a Strengths–Weaknesses–Opportunities–Threats (SWOT) framework to generate strategic recommendations for strengthening policy implementation.

Materials and Methods

Study Design: A descriptive cross-sectional study employing a convergent mixed-methods design was conducted to comprehensively evaluate the implementation of the Eat Right Campus (ERC) policy within a tertiary healthcare setting.[15,16] The quantitative component evaluated structural and operational compliance using the **standardised** FSSAI Hygiene Rating Checklist, complemented by a knowledge, attitude and practice (KAP) survey of food handlers based on the WHO Five Keys to Safer Food Manual. The qualitative component explored institutional, behavioural and systemic determinants of policy implementation through stakeholder perspectives obtained from focus group discussions (FGDs) and in-depth interviews (IDIs). Both components were conducted concurrently over six months and integrated during the interpretation phase to yield triangulated evidence.

Study Setting: The study was conducted at the Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh — a premier tertiary care teaching hospital in North India that serves a large inpatient and outpatient population and acts as a referral centre for multiple neighbouring states. The institutional food environment comprises hospital canteens for patients and attendants, hostel mess facilities for students and residents, vendor-operated kiosks and staff dining facilities. These outlets collectively cater to a heterogeneous population of patients, healthcare professionals, students and visitors, representing a high-volume and operationally diverse food system. The ERC certification framework had been implemented on the campus before the present study, making PGIMER an appropriate setting for policy-implementation assessment.

Study Population, Sampling and Data Collection:

Quantitative component: All registered food business operators (FBOs) functioning within the institutional campus at the time of the study were included through universal sampling to ensure comprehensive coverage and eliminate selection bias. A total of 30 food outlets were audited, each treated as an independent unit of assessment. The primary respondent for audit verification was the outlet manager or designated food-safety supervisor. Outlets that were non-operational or under structural renovation during the audit window were excluded.

The standardised FSSAI Hygiene Rating Checklist, developed in accordance with FSSAI Schedule 4 guidelines[17] and ERC operational requirements,[6] was used to assess compliance across seven domains: (i) personal hygiene practices (use of gloves, head covers, protective clothing, handwashing facilities and medical-fitness certification); (ii) infrastructure adequacy (kitchen layout, workflow separation, ventilation, lighting, potable-water availability and structural integrity); (iii) food storage and temperature control (segregation of raw and cooked foods, refrigeration adequacy, temperature-monitoring logs and first-in-first-out practices); (iv) pest management (pest-control contracts, evidence of infestation and record maintenance of cycles); (v) waste disposal and sanitation (segregation, covered bins, disposal frequency and drainage systems); (vi) documentation and record maintenance (licensing certificates, hygiene audit reports, temperature logs and cleaning schedules); and (vii) staff training certification (FoSTaC certification, refresher training and internal training records). Each indicator was scored on a three-point scale (0 = non-compliant; 1 = partially compliant; 2 = fully compliant). Domain-wise and overall compliance percentages were computed for each outlet, which were then **categorised** into four compliance levels: Needs Improvement (<60%), Fair (60–74%), Good (75–89%) and Very Good (≥90%). Audits were performed through direct observation, document verification and structured interaction with outlet personnel.

Standardised operational definitions were applied to each scoring criterion; where ambiguity arose, consensus-based scoring was applied following research-team review. A pilot audit of two non-study outlets was conducted before the main data collection to refine tool wording and inter-observer agreement.

Food handlers' KAP regarding food safety and hygiene was assessed using a structured questionnaire adapted from the WHO Five Keys to Safer Food Manual[18] and established KAP survey methodology. The questionnaire was reviewed by subject experts and pilot-tested before data collection. It comprised three domains:

- Knowledge domain — 11 items, scored as 1 (correct) or 0 (incorrect/don't know); maximum score 11. Items covered foodborne pathogens, cross-contamination, temperature danger zones, personal hygiene and safe storage.
- Attitude domain — 5 items rated on a 2-point dichotomous scale (agree = 2; disagree = 0); maximum score 10. Items reflected perceived importance of hygiene practices, willingness to report illness and personal responsibility for safety.
- Practice domain — 25 items rated 0 (never), 1 (sometimes) or 2 (always); maximum score 50. Items covered hand washing frequency, glove use, surface sanitation, temperature monitoring and waste handling.

Qualitative component: Purposive maximum-variation sampling was used to ensure representation across stakeholder categories, with recruitment continued until thematic saturation was achieved.[19] Participants included food handlers and outlet managers, campus consumers (students, healthcare staff and patient attendants), administrative officials responsible for campus operations, and supervisory personnel overseeing hygiene and food-safety compliance. Data were collected through five Focus Group Discussions (FGDs) with Food Business Operators (FBOs), each comprising six participants; five Focus Group Discussions with consumers, each comprising six participants; five In-Depth Interviews (IDIs) with representatives of the highest-footfall food outlets; and one IDI with a senior institutional stakeholder. Semi-structured interview guides were developed a priori based on the ERC framework and refined iteratively. All sessions were conducted in a private setting, lasted approximately 45–60 minutes, audio-recorded with informed consent, and transcribed verbatim. Field notes were maintained by an independent note-taker.

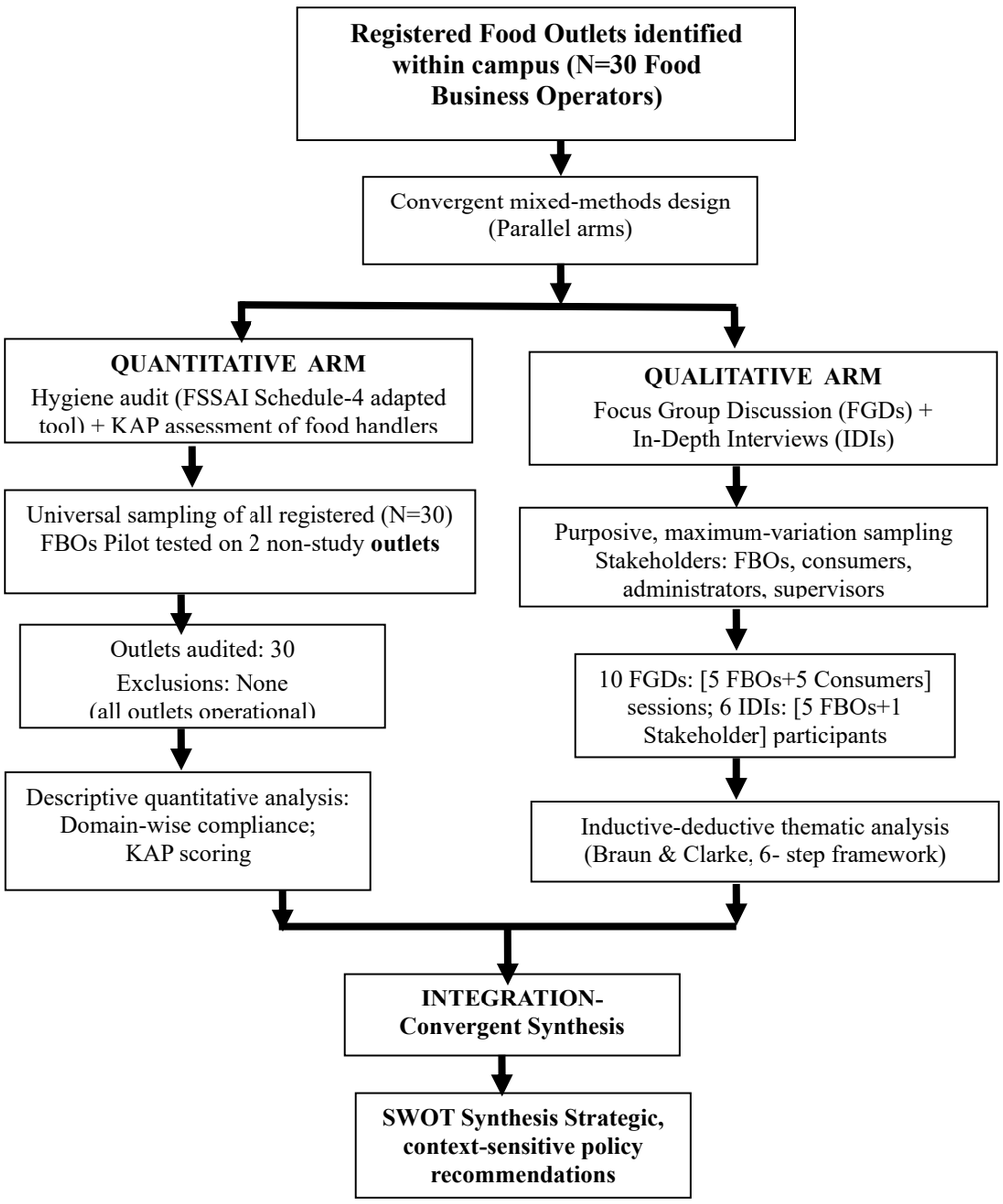
***Data Analysis*:** Quantitative data were entered into a spreadsheet, double-checked for accuracy and analysed using descriptive statistics. Overall compliance distribution, domain-wise performance and frequency of compliance levels were summarised as frequencies, proportions and percentages. Inferential statistics were not applied, as the objective was descriptive implementation assessment rather than hypothesis testing. Examination of associations between institutional, operational and food-handler-related factors and compliance outcomes is planned as part of subsequent analyses to be reported separately.

Qualitative transcripts were analysed using an inductive–deductive thematic approach guided by the six-step framework of Braun and Clarke.[20] Deductive codes were derived from the study objectives and the ERC operational framework (infrastructure, training, monitoring and governance); inductive codes emerged from participant narratives. Codes were iteratively reviewed and grouped into higher-order categories and then into overarching themes. Two researchers coded the transcripts independently and resolved discrepancies through consensus discussion. Credibility was enhanced through investigator triangulation, data-source triangulation across the four stakeholder groups, and peer debriefing within the research team. Thematic saturation was confirmed when no new codes emerged from successive transcripts.

Integration was performed using a convergent design. Quantitative audit findings informed the identification of structural strengths and weaknesses, while qualitative themes contributed contextual opportunities and threats. These were synthesised into a SWOT matrix derived using the TOWS analytical framework of Weihrich.[21] Strengths and Weaknesses (internal factors) were drawn from the quantitative components (domain-wise audit compliance, KAP scores and observed infrastructural indicators), classified as internal where the institution exercised direct managerial control. Opportunities and Threats (external factors) were derived primarily from the qualitative themes, supplemented by contextual literature on regulatory environment, technology adoption and market forces, classified as external where the factor lay outside direct institutional control. Two researchers independently mapped each finding into the four SWOT quadrants; inter-rater agreement was assessed and discrepancies resolved through consensus discussion with a third researcher. The final SWOT matrix was reviewed by the wider research team and validated through investigator triangulation.

Ethical Considerations: Ethical approval was obtained from the Institutional Ethics Committee of PGIMER, Chandigarh prior to initiation of the study (IEC Reference Number: IEC-INT/2022/PhD-839, dated 15 March 2024). Written informed consent was obtained from all participants. Participation was voluntary, and participants were informed that findings would be used solely for academic purposes and institutional quality improvement. Confidentiality was maintained throughout: personal identifiers were removed from all data, audit findings were anonymised by outlet code, and data were stored securely on password-protected institutional devices with access limited to the research team.

Figure-1: Study flow diagram depicting the convergent mixed-methods design used to assess Eat Right Campus policy implementation. FBO = Food Business Operator; KAP = Knowledge, Attitude, Practice.



FBO= Food Business Operator; KAP= Knowledge, Attitude, Practice;
FSSAI= Food Safety and Standards Authority of India

Results

Hygiene Rating Distribution: All 30 registered food outlets were successfully audited, yielding a 100% response rate. Every outlet met the minimum regulatory threshold for operation. However, the distribution of hygiene ratings was skewed towards lower categories (Figure 1). Only one outlet (3.3%) achieved a Very Good rating, three outlets (10.0%) were rated Good, eighteen (60.0%) were classified as Fair, and eight outlets (26.7%) fell into the Needs Improvement category.

Figure- 2: Distribution of hygiene rating categories among 30 registered food outlets at a tertiary care institution, North India (2023–24).

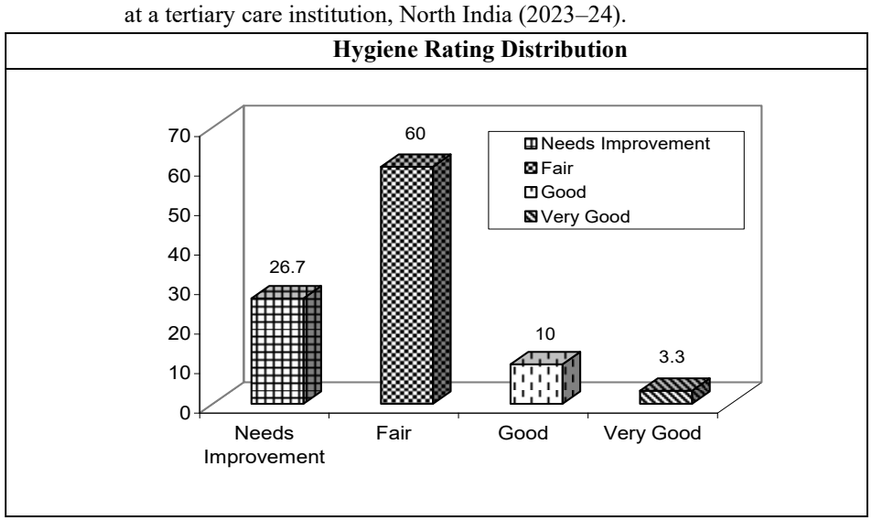


Table-1: Domain-wise compliance of registered food outlets (n=30) under the Eat Right Campus audit at a tertiary care institution, North India.

Domain	Outlets fully compliant		Key deficits identified
	No.	%	
Personal hygiene practices	24	80.0	Inconsistent glove use in high-turnover outlets; medical-fitness certificates absent in ~20%.
Infrastructure adequacy	20	66.7	Space constraints limiting workflow segregation; ventilation inadequate in selected hostel messes.
Food storage and temperature control	14	46.7	Temperature logs absent or intermittently maintained; refrigeration monitoring inadequate.
Pest management	22	73.3	Periodic pest-control cycles contracted, but record-maintenance gaps noted.
Waste disposal and sanitation	19	63.3	Inconsistent segregation; uncovered bins observed in a minority of outlets.
Documentation and record maintenance	9	30.0	Widespread gaps in hygiene audit reports, cleaning schedules and internal records.
Staff training certification (FoSTaC)	15	50.0	Enrolment reported but on-site certificate verification frequently incomplete.

Domain-wise Compliance: Compliance varied substantially across the seven audited domains (Table 1). Personal hygiene practices and basic infrastructure demonstrated the most consistent compliance, whereas documentation and record

maintenance, together with temperature-control monitoring, emerged as the weakest-performing domains. Pest-control contracts were in place in the majority of outlets, although record-maintenance gaps were observed. Waste segregation showed variable adherence. Staff training certification coverage was uneven on on-site verification despite universally reported FoSTaC enrolment.

Table-2: Percent hygiene compliance, hygiene rating, and knowledge, attitude and practice (KAP) scores for 30 food outlets. Coding: **Bold Letter** = Higher, ***Italic Letter*** = Moderate, **Simple Letter** = Lower scores.

Outlet No.	Percent compliance (Hygiene)	Hygiene Rating	Knowledge Score	Attitude Score	Practice Score
1.	***49***	Fair	9	**10**	***48***
2.	34	Need Improvement	5	**10**	46
3.	41	Fair	5	**10**	46
4.	56	Fair	10	**10**	**50**
5.	**75**	**Good**	***7***	8	46
6.	***46***	Fair	5	**10**	**50**
7.	***49***	Fair	**11**	**10**	**50**
8.	43	Fair	***7***	6	**50**
9.	***46***	Fair	8	**10**	***48***
10.	***46***	Fair	***7***	8	**50**
11.	39	Need Improvement	8	6	43
12.	***56***	Fair	5	**10**	**50**
13.	**85**	**Very Good**	6	8	44
14.	***56***	Fair	***7***	7	42
15.	30	Need Improvement	8	7	***48***
16.	**62**	**Good**	8	**10**	41
17.	***51***	Fair	***7***	**10**	42
18.	30	Need Improvement	9	**10**	***48***
19.	**66**	**Good**	5	***9***	***48***
20.	***45***	Fair	*7*	**10**	46
21.	***51***	Fair	**11**	8	47
22.	***44***	Fair	***7***	**10**	42
23.	***51***	Fair	6	8	36
24.	28	Need Improvement	***7***	4	**50**
25.	41	Fair	6	***9***	***48***
26.	28	Need Improvement	9	***9***	**50**
27.	39	Fair	8	8	**50**
28.	***56***	Fair	***7***	***9***	49
29.	26	Need Improvement	***7***	**10**	45
30.	***54***	Fair	***7***	**10**	45

Knowledge, Attitude and Practice Scores: Summary statistics for the three KAP domains are presented in Table 2. The KAP assessment indicated moderate knowledge levels, with a median score of 7 (IQR: 6–8) out of 11 and a mean score of 7.30 ± 1.64, while 19 (63.3%) outlets scored below the 70% benchmark. In contrast, attitudes toward food safety were highly positive, with a median score of 10 (IQR: 8–10) out of 10 and a mean score of 8.80 ± 1.56, and all outlets achieved the benchmark. Food safety practices showed the strongest performance, with a median score of 48 (IQR: 45–50) out of 50 and a mean score of 46.60 ± 3.94, with all outlets meeting the benchmark. Overall, the findings suggest that positive attitudes are being translated into good food safety practices; however, substantial knowledge gaps persist and require targeted training and capacity-building interventions to strengthen food safety awareness and understanding.

Qualitative Themes: Four broad themes emerged from the qualitative inquiry. (i) Enforcement-driven compliance — stakeholders described policy implementation as inspection-cycle driven rather than embedded in routine practice, with outlets reporting heightened adherence around scheduled audits. (ii) Infrastructural constraints — restricted kitchen area in older establishments, limited workflow segregation and inadequate ventilation were perceived as the principal structural impediments. (iii) Economic pressures — thin operating margins were cited as the reason for under-investment in documentation systems and advanced pest-control contracts. (iv) Consumer transparency expectations — consumers placed visible trust in observable hygiene cues such as counter cleanliness, staff grooming and display of hygiene ratings, while administrative officials emphasised the need for digital dashboards and real-time monitoring to sustain compliance beyond inspection cycles.

SWOT Synthesis: The integrative SWOT matrix is presented in Figure 3. Internal factors comprised institutional leadership, structured tender systems and overall minimum-standard attainment (Strengths), set against inconsistent documentation, limited digital monitoring and uneven food-handler knowledge (Weaknesses). External factors comprised QR-code-based consumer feedback systems, public hygiene dashboards and peer mentorship by high-performing outlets (Opportunities), set against rising operational costs, administrative fragmentation across multiple vendor contracts, and the risk of compliance regression between inspection cycles (Threats).

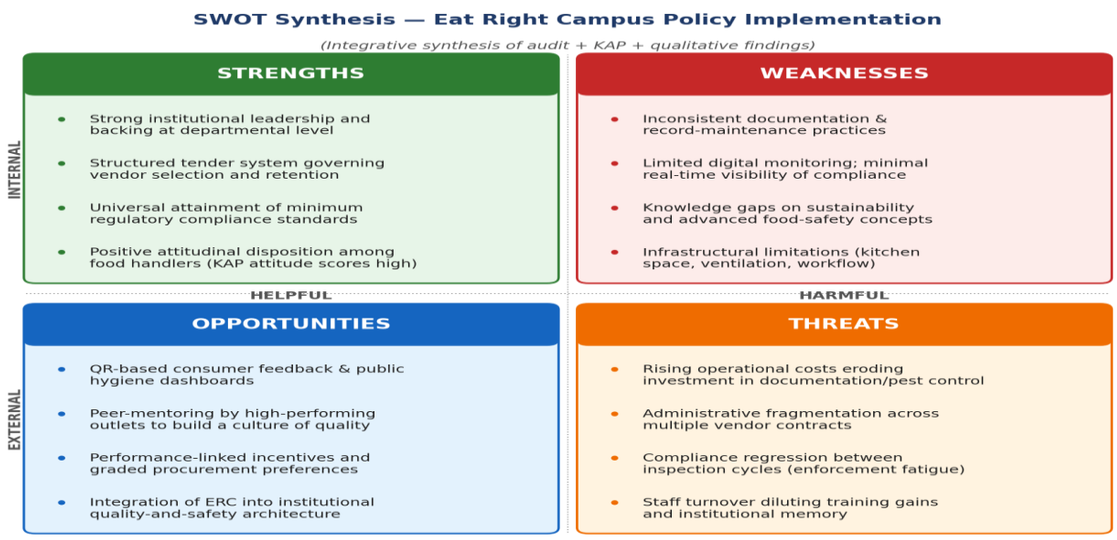


Figure-3: SWOT (Strengths–Weaknesses–Opportunities–Threats) matrix synthesising quantitative audit, KAP and Qualitative findings on Eat Right Campus implementation.

Discussion

This mixed-methods assessment demonstrates that, although the Eat Right Campus (ERC) policy has secured universal attainment of minimum hygiene standards across all 30 audited outlets, **institutionalisation** of food-safety practices remains incomplete. The skewing of compliance towards the lower rating categories, taken together with the weakest performance in the documentation and temperature-control domains (Figure 1; Table 1), indicates that structural fidelity has outpaced behavioural embedding. The co-occurrence of uniformly high attitudinal scores with variable knowledge scores and a preserved practice profile (Table 2) signifies a latent capacity-building opportunity: food handlers are willing to comply but lack the conceptual depth that would enable independent, risk-based decision-making in the absence of direct supervision.

The enforcement-driven character of compliance identified here is consistent with regulatory governance theory, which holds that inspection frequency is a primary determinant of episodic adherence but is insufficient, in isolation, to generate an embedded safety culture.[22] Studies of institutional catering in Brazil, Portugal and the United Kingdom have similarly demonstrated that food-safety training improves declarative knowledge more readily than sustained behavioural change, particularly where reinforcement mechanisms are weak.[23–25] Interventional work among hospital food handlers within India — including from our own institution and from LHMC Delhi — has shown that structured educational packages produce significant KAP gains that decay in the absence of institutional reinforcement.[13,14] The present findings therefore triangulate rather than merely echo this body of evidence, and suggest that ERC certification should be viewed as the inception of a sustained compliance journey rather than as its endpoint.

The infrastructural challenges identified — restricted kitchen space, inadequate ventilation and limited workflow segregation — mirror those documented in international hospital catering literature and highlight the need for regulatory frameworks that are sensitive to contextual heterogeneity.[23,24] Economic pressures may further attenuate compliance, particularly among vendors operating with thin margins, for whom investment in documentation systems and advanced pest-control contracts may be deprioritised.[26] These observations support the consideration of incentive-based regulatory mechanisms — such as rating-linked procurement preferences, recognition programmes or graded compliance support — alongside conventional inspection-based enforcement.

Consumer perspectives identified in the qualitative inquiry are consistent with risk-perception theory, which holds that observable cues play a central role in shaping safety judgements.[27] Transparent hygiene-display systems — including visible rating certificates, QR-code-based grievance pathways and public dashboards — may therefore strengthen accountability and consumer trust while simultaneously exerting normative pressure on outlets that fall below peer standards. The consistently weakest performance in documentation and record maintenance points directly towards digitalisation as a high-leverage intervention: cloud-based temperature logs, automated cleaning-schedule reminders and centralised FoSTaC registries could address many of the identified gaps at relatively modest marginal cost.

Strengths and limitations. Strengths of the study include comprehensive coverage of all registered food outlets within a high-volume tertiary care institution, integration of structural audit, KAP measurement and qualitative stakeholder perspectives within a single convergent mixed-methods design, and the use of a TOWS-anchored SWOT framework to translate findings into actionable strategy. Several limitations must also be acknowledged. First, as a single-site descriptive study, generalizability to other institutional settings is constrained, although the structural and behavioural patterns identified are likely transferable to comparable tertiary campuses. Second, Hawthorne effects during on-site audits cannot be fully excluded. Third, the cross-sectional design precludes causal inference between structural and behavioural determinants of compliance. Finally, the qualitative component relied on researcher judgement regarding saturation, and — while strengthened by investigator triangulation and peer debriefing — was not supplemented by formal respondent validation.

Public-health implications. In tertiary care settings, food-safety lapses intersect directly with infection-prevention priorities; embedding the ERC policy within the broader institutional quality-and-safety architecture, rather than treating it as a stand-alone

certification exercise, is therefore essential. Transitioning towards culture-driven food safety will require multi-stakeholder governance that balances guidance and enforcement,[28] operationalised through supportive supervision models, performance-linked incentives, routine refresher training, and the digital infrastructure needed to render compliance continuously visible.

Conclusion

Implementation of the Eat Right Campus policy in this tertiary care institution has achieved foundational compliance with regulatory food-safety and hygiene standards; however, gaps in documentation, monitoring and food-handler knowledge indicate that institutionalisation of food-safety practices remains incomplete. Strengthening long-term compliance will require a transition from predominantly inspection-based approaches towards supportive supervision, continuous capacity building, infrastructural improvement and institutional ownership. Embedding the Eat Right Campus framework within broader institutional quality and patient-safety systems, supported by digital monitoring and transparent reporting, may foster a more resilient and culture-driven approach to food safety in comparable healthcare settings.

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