Halal-HACCP Food Safety Competency Development for the 2019 SEA Games

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Knowledge-practice competency building was developed and evaluated through the use of the Centers for Disease Control and Prevention (CDC) training of trainers (TOT) framework utilizing subject matter experts (SMEs) as master trainers to create a pool of trained trainers who then implement the needed training of industry (TOI). The efficacy of the tested framework indicated that the results of the TOT and TOI competency self-evaluations, before and immediately after the respective training, improved from deficient to basic competency ratings of participants. The walk-through audit conducted by the trained trainers attested to their capability to identify compliance indicators for Halal, HACCP, and its prerequisite programs during the audit in the provision and service of food in games and accommodation sites of the 2019 SEA Games. The learnings established in the building of knowledge-practice competency during the 2019 SEA Games were recommended to be a useful case study in the formulation of a best practice for general sports event management that requires the implementation of the Halal-Hazard Analysis Critical Control Point Food Safety System (HHACCP FSS).

Keywords: 2019 SEA Games, competency assessment, HACCP, Halal, sports event, training of trainers

INTRODUCTION

When the Philippines agreed to host the 2019 Southeast Asian Games as an alternate host country (France-Presse 2015), it was clear that among the issues that should be addressed was the provision of Halal foods for Muslims who would be attending the said sports event. In Southeast Asia, about 40% of the population or more than 260 million are Muslims, with the majority coming from Asian Islamic countries – including Indonesia, Malaysia, and Brunei (Cornell University 2021). Attending to the special dietary needs like those required by Islam is a special concern in any major event planning and management (Pelly and Burkhart 2014). Unfortunately, even during the early planning period of the 2019 SEA Games, other member countries involved in the event were already expressing concern about the possible shortage of supply of Halal foods for Muslim stake players (Nordin 2019; Raihan 2019; Sabillo 2019).

An initial consultation with the Philippine Southeast Asian Games Organizing Committee (PHISGOC) Food Catering Team by the representatives from the Food Science and Nutrition Department [College of Home Economics, University of the Philippines, Diliman (CHE-UP Diliman)] and the Philippine Council for Industry, Energy, and Emerging Technology Research and Development of the Department of Science and Technology (DOST-PCIEERD) was done in the 2nd quarter of 2019 to discuss the concern related to the
availability of Halal foods during the SEA Games. An agreement was reached to pursue further initiatives by CHE-UP Diliman and DOST-PCIEERD to support an HHACCP FSS knowledge-practice competency building of food industry personnel who will participate in the games. The PHISGOC was mandated as the official body by the Philippine government to oversee all the sport event activities related to the 2019 SEA Games in a memorandum circular from the Office of the President of the Philippines Malacañang (Memorandum Circular No. 56 2019).

Halal-certified foods encompass all foods that are permitted by the strict Islamic Shariah Law for human consumption (Ab Talib et al. 2016). The concepts of safety and wholesomeness of food in all aspects of processing, preparation, and service is integral to Halal (Bonne and Verbeke 2008). On the other hand, HACCP is a food safety management system that identifies, evaluates, and controls specific hazards in food that can complement the Halal concept to ensure the safety and wholesomeness of Halal food (Ghafar et al. 2015).

Generally, science and research on knowledge-practice competency of the HHACCP FSS in the Philippines can still be considered in its early developmental stages considering that the passage of Republic Act (RA) No. 10817 or “Philippine Halal Export Development and Promotion Act of 2016” was only signed in 2016 and its implementing rules and regulations (IRR) in 2017. The DOST was identified in RA No. 10817 (2016) to assist in knowledge capacity building by taking the lead in human capital development to support Halal food promotion, specifically in skills training for its industry workers emphasizing strict compliance to Halal food safety.

Initiatives towards human capital development anchored on knowledge-skills competency training have been reported to forward Halal food industries in various countries (Hashim and Shariff 2015). The extensive training approach has been previously used in the transfer of Halal knowledge to meet Muslim dietary requirements and satisfy general public demand (Nain et al. 2013). The TOT approach was successfully used for the HACCP-based training in the retail and foodservice establishments for communities across the United States (Martin et al. 1999). This study aimed to assess the competency of trained trainers, instructed using the CDC (2019) TOT approach in the HHACCP FSS, in cascading knowledge-practice competency to food industry personnel involved in the provision of food for the 2019 SEA Games.

MATERIALS AND METHODS

Research Overview

The study evaluated knowledge-practice competency building of trained trainers through the use of the CDC (2019) TOT approach. The training approach utilized in the study involved SMEs who trained trainers on the HHACCP FSS. This pool of certified trained trainers implemented a TOI to eventually cascade knowledge-practice competency to food manufacturers, processors and service personnel, and PHISGOC food safety auditors who were involved in the provision of food for the 2019 SEA Games.

Self-assessments of the knowledge-practice competencies before and immediately after the TOT and TOI sessions were conducted. A competency assessment tool was used by all trainee respondents assessing: 1) knowledge competency as the capability to identify basic concepts and principles of the HHACCP FSS; 2) skills practice competency in the evaluation and comprehension of basic concepts and principles of the HHACCP FSS through training, mock audit, and operation as an internal auditor to a working HHACCP Plan; and, lastly, 3) advanced experience in the formulation of corrective actions for deviations and experience as an external auditor of a working HHACCP Plan. Evaluation of the knowledge-practice competency of the certified trainers to identify Halal, HACCP, and its prerequisite programs compliance indicators was also done by walk-through audit involving observations, face-to-face interviews, and review of documents, when possible.

Qualifications for the SMEs

The study recruited two SMEs in the field of the HHACCP FSS to implement the TOT activity. The international master trainer qualification was based on the working definition for an SME cited by Everman (2008). A local SME was also hired to help contextualize the training information provided by the international SME as it applies under the Philippine setting during the TOT.

Recruitment of TOT participants

The recruited TOT participants were government-hired staff of DOST and affiliates from the academic institution CHE-UP Diliman who were identified as part of the food safety staff of their respective institutions. Preference to the selection of participants were those who were tenured to secure sustainability in personnel retention and belonging to the Islamic religion. All the participants agreed to eventually provide echo training sponsored by the DOST Halal science and technology program nationwide.
TOT Curriculum
A training package curriculum for the TOT was developed by SMEs summarized in Table 1. It consists of training modules and a design for a practical mock audit experience activity for the TOT. The training module topics covered the necessary principles and concepts on the HHACCP FSS. The training activity was designed with a supervised mock audit in a food service facility and a final theoretical examination for the certification of trained trainers.

The delivery of the competency-based training curriculum included classroom-type instructions on several topics, discussions of related case studies based on the experiences of the SMEs, question and answer sessions after discussion of each module, and a final theoretical examination administered by the SMEs to the TOT participants for certification. This final examination for certification included questions answerable by fill-in-the-blanks, short essay answers, and enumeration. All examinations were corrected personally by the international SME. Completion of the training and attainment of a rate of 76% and above in the examination administered by international SME was the qualification bases for certification as trained trainers on the HHACCP FSS. As trained trainers, the TOT participants developed teaching modules for use in a mock teaching activity under the supervision of international and local SMEs prior to the TOI.

Knowledge-Practice Competency Evaluation of TOT Participants
Knowledge-practice competency evaluation of TOT participants was determined using a dichotomous self-assessment tool (Figure 1) that was answered before and immediately after the TOT training. A TOT participant was considered with a “basic” competency if the trainee was able to answer positively (“yes”) for all questions from 1–7. This “basic” competency rating was limited by the actual knowledge-practice transfer provided within the curriculum of the TOT of this present study. Any negative answers (“no”) to questions 1–7 may indicate a TOT participant as “deficient” in competency level. Questions 8–10 determine the capability of trainees to perform the audit either as an internal auditor and/or external auditor of a working HHACCP plan. These advanced competencies can be considered as the resulting practical applications of the knowledge-practice training that was provided in the TOT and indicates that the participant has attained a “proficient” level of competency.

Comparison of pre- and post-assessments was conducted as a measure to gauge the efficacy of the TOT session provided. The responses per question were tallied and reported as % negative response per question in the assessment tool. The % negative answers were calculated as the total number of negative (“no”) answers per question divided by the total number of trainee respondents multiplied by 100. Comparisons of % negative answers per question were evaluated to help determine basic, deficient, and proficient competency levels and the subsequent improvements as a result of training.

Recruitment and Training of TOI Participants
The PHISGOC recruited TOI participants coming from the various food manufacturers and suppliers, caterers, and foodservice sectors from the National Capital Region (NCR) and Region 4A (CALABARZON) who would be involved in the provision of food in the SEA Games. The PHISGOC also invited some members of its Food Safety Team (FST) members to attend the TOI training.

The curriculum of the TOI was based on the teaching modules developed by the trained trainers in the TOT and approved by SMEs. The mode of delivery for the competency-based training curriculum utilized in the TOI was the same, as previously described in the TOT sessions.

Table 1. Curriculum for TOT*

<table>
<thead>
<tr>
<th>Training modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1: Introduction: Halal Awareness Food Program for Halal Caterers; Islamic Guidelines on Halal Food Practice (MS1500-2019)</td>
</tr>
<tr>
<td>Module 2: Halal Food Program for Inflight Caterers; Islamic Guidelines on Halal Food Practice (MS1500-2019)</td>
</tr>
<tr>
<td>Module 3: Fundamentals of Shariah in Halal Assurance System</td>
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<tr>
<td>Module 4: Food Safety Assurance Plan in Halal Certification</td>
</tr>
<tr>
<td>Module 5: Identifying Halal Compliance Critical Control Point in Halal Audit Process</td>
</tr>
<tr>
<td>Module 6: Global Halal Management System: Halal Compliance Audit Checklist</td>
</tr>
<tr>
<td>Module 7: TOT; Comprehensive Halal Awareness</td>
</tr>
<tr>
<td>Module 8: Auditor’s Development Program</td>
</tr>
<tr>
<td>Practical experience</td>
</tr>
</tbody>
</table>

*Prepared by the international SME associated with an international Halal certification body
Knowledge-Practice Competency Evaluation of TOI Participants

Self-assessments of knowledge-practice competency of TOI participants were determined using the same assessment tool (Figure 1) in TOT that was similarly answered before and immediately after the TOI training. A minor adjustment in assessing the level of competency of TOI participants was made because the TOI was not able to implement the scheduled mock audit. Therefore, for the “basic” competency rating in TOI, a participant was considered with “basic” competency if the trainee was able to answer positively (“yes”) in all questions from 1–6. Any negative answers (“no”) to questions 1–6 may indicate a TOI participant as “deficient” in competency level. Questions 7–10 determined the capability of trainees to perform the mock audit or audit of a working HHACCP plan as an internal auditor.

The comparison of improvement of competencies was determined as described previously in the assessment done for TOT participants.

Walk-through Audit

A walk-through audit was conducted to assess the capability of the certified trainers to identify Halal, HACCP, and its prerequisite programs compliance indicators. The trained trainers were assigned to audit accommodation dining areas, as well as food service lounges in game sites to determine compliances to the HHACCP FSS as implemented by food industries involved in the 2019 SEA Games. The PHISGOC assigned the sites to be audited and the audit activity per site was done in close coordination with the specific PHISGOC food safety personnel on-site.

For the walk-through audit, each of the trained trainers must refer to the following: 1) the enhanced the PHISGOC food safety checklist that was amended to incorporate Halal concerns, 2) the time and temperature controls for hot and cold foods indicated in the food safety checklist (Table 2) that was referred by the PHISGOC FST as the working CCPs for HACCP plan compliance in food service, and 3) the prerequisite programs for HHACCP as specified in the TOT provided copies of MS 1500:2019 (2019). In relation to the enhancement of the original PHISGOC food safety checklist to include Halal concerns, the main focus of the amendments was on the separation of Halal foods from non-Halal foods in terms of storage, preparation, and service areas. Emphasis on the enhancements of the checklist was based on the prevention of cross-contamination of Halal foods.

Figure 1. Competency assessment tool (answerable by “yes” or “no”). For levels of competency, any “no response” from questions 1–7 ranks a participant with a “deficient” level of competency.
The trained trainers had also to carry their authorization documents for the walk-through audit per site. This official authorization document shows the signatures of the stakeholders from PHISGOC, key project team members, and heads of institutions from where the trained trainers are affiliated. It defined that the trained trainers doing the audit were limited to documentation to compliance and/or deviations from the identified Halal, HACCP, and prerequisite program compliance indicators.

Trained trainers audited compliances or deviations through observations, face-to-face interviews with food service personnel, and document review when possible. The results of these observations were provided to the following: PHISGOC FST member on-site, PHISGOC FST manager through electronic mail, and the project team. The necessary corrective actions were formulated and implemented only by the PHISGOC FST personnel as the official implementer of food safety controls in the SEA Games. The submitted results of the walk-through audits to the project team were tallied and reported as % compliance or deviations (non-compliance) of audited sites. These results were calculated as the total number of sites showing compliance or non-compliance per indicator divided by the total number of accommodation or game sites audited multiplied by 100.

**RESULTS AND DISCUSSION**

**TOT SMEs**

Table 3 presents the key qualifications of the recruited SMEs for the TOT session. Both SMEs are experts in Halal food safety based on educational degrees earned and work experiences. The SMEs were qualified not only as trainers but had actual experiences in the implementation of a working Halal FSS. Affiliation to the Islamic religious belief strengthened the credibility and authenticity of both SMEs as a source of knowledge and information on the Halal Islamic concept that is integrated with safe food handling. The international SME delivered an accredited training course in HHACCP FSS and issue certificates to qualified trainees as a formal recognition of competence to work as certified trainers emanating from an internationally recognized body. The local SME helped contextualize the training knowledge and skill competencies provided by the international SME as it applies under the Philippine setting during the TOT.

Everman (2008) cited that SMEs can provide a whole new perspective to the required field of expertise as training participants instantly perceive SMEs as credible due to their real-world experience, up-to-date knowledge, and world-class industry expertise in the required field of

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**Table 2.** Excerpt food safety checklist indicating identified HACCP critical control points for time and temperature controls in foodservice.

<table>
<thead>
<tr>
<th>Temperature control in food handling</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cold food held at 4 °C or below is maintained, monitored, and recorded.</td>
<td></td>
</tr>
<tr>
<td>2. Hot cooked food held at 60 °C or above is maintained, monitored, and recorded.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time control in food handling</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Hot cooked food held without temperature control can be served or sold for up to 4 h. It should be properly labeled and identified.</td>
<td></td>
</tr>
<tr>
<td>4. Within the 4-h time limit: raw food ingredients should be hot cooked and served, and ready-to-eat food shall be served.</td>
<td></td>
</tr>
<tr>
<td>5. All hot food held without temperature control exceeding the 4-h limit shall be disposed of.</td>
<td></td>
</tr>
</tbody>
</table>

**Table 3.** Summary of key qualifications of SMEs.

<table>
<thead>
<tr>
<th>Key qualifications</th>
<th>International</th>
<th>Local</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nationality</strong></td>
<td>Malaysia</td>
<td>Philippine</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td>Diplomas in Islamic Studies, Islamic Theology, and Islamic Law</td>
<td>Master of Arts in Islamic Studies</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td>Islam</td>
<td>Islam</td>
</tr>
<tr>
<td><strong>Work experience</strong></td>
<td>- Principal Halal Consultant for Malaysia Halal Consultation and Training Agency</td>
<td>- Commissioner-in-Charge for Halal Program, National Commission on Muslim Filipinos</td>
</tr>
<tr>
<td></td>
<td>- 39-yr experience as Manager at Halal Audit and Compliance Department for Malaysia Airlines</td>
<td>- Former Senior Lecturer, Institute of Islamic Studies, University of the Philippines Diliman</td>
</tr>
<tr>
<td></td>
<td>- Certified Halal Food Processing</td>
<td>- Experience in conducting training and seminars through serving as resource speaker on Halal in the country</td>
</tr>
<tr>
<td></td>
<td>- Handling Trainer for Malaysia Airlines</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Experience in training in-flight catering management personnel, production staff, and food suppliers worldwide</td>
<td></td>
</tr>
</tbody>
</table>
study. The SMEs of the project, as a key implementer of the training curriculum and main source of the general and indigenized concepts of the HHACCP FSS, must have the qualifications and expertise related to the FSS. Specifically, SMEs must be highly knowledgeable and technically skilled on the subject matter of the training to relate better to the knowledge and skills needed by the learners (Carnevale et al. 1990).

TOT Participants
Table 4 shows the demographics of participants to the TOT conducted. The profile of a typical participant to the TOT is a permanently employed government personnel working for either a research or an academic institution. These employees are either a member or non-member of the FST of their institution and generally a non-Muslim. Section 14 of the RA No. 10817 of the Congress of the Philippines (RA No. 10817 2016) details that the DOST is mandated to establish and implement an institutional and human resource development program for Halal industry development, inclusive of skills trainings like the TOT in partnership with state universities and colleges and the private sector. Earlier preference for the participants was permanency of employment, membership to their institutional FST, and preferably Muslim self-identity. Unfortunately, the project team was not able to recruit 100% permanently employed personnel since there is a high turnover of technical personnel working for the government. The project team was also not able to recruit all TOT participants who are FST members of their respective institutions, since some TOT participants are working personnel of the Halal laboratories of DOST and members of the academe who are only indirectly involved in an FST. Moreover, recruitment of a high percentage of Muslims to the training could not be implemented since Muslims represent a minority group of the Philippine population at only 6% of the total population of the country (PSA 2017).

Competency of TOT Participants
Table 5 shows the results of the pre- and post-self-assessments for the competency of the TOT participants. Assessments are essential in determining the level of mastery, determining the presence of prerequisite skills, screening, or classifying the eligibility of a learner to a specific field of knowledge based on a set of criteria (OECD 2013). Ross (2006) forwarded the benefits of self-assessment as being reliable and consistent as a measurement tool for learners. Self-assessment has also been cited as an effective way to determine knowledge competencies in the implementation of Halal (Giyanti et al. 2020) and HACCP in food service (Coleman and Griffith 1998).

Results of the pre-assessment showed that the majority of TOT participants have deficient competency with almost 40–55% of the participants lacking the capacity to even identify basic concepts and principles of the HHACCP FSS. Moreover, the majority have limited background experience and advance experience or practice in the evaluation of concepts and principles of the HHACCP FSS corresponding to 88–100% of the participants. Because Halal food safety audit is a developing practice in the food manufacturing and foodservice industry in the country (Acas and Loanzon 2020), its framework needs to be institutionalized to the greater food safety and service auditors of food businesses.

Results of the post-assessment showed that the majority of the TOT participants have improved general knowledge of the HHACCP FSS through identification of basic concepts and principles, with only about 5–10% of the participants saying they lacked this competency after the TOT session. Improvements were also observed in the competency assessment results with only about 25–65% of participants saying they still lacked the competencies in evaluating the HHACCP FSS through background experience and advanced experience after undergoing the TOT. Based on

Table 4. Demographics of participants (n = 31) to the TOT.

<table>
<thead>
<tr>
<th>Qualifications</th>
<th>Category</th>
<th>No. of participants*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional affiliation</td>
<td>Academic</td>
<td>7 (22.6%)</td>
</tr>
<tr>
<td></td>
<td>DOST**</td>
<td>21 (67.7%)</td>
</tr>
<tr>
<td></td>
<td>PHISGOC***</td>
<td>3 (9.7%)</td>
</tr>
<tr>
<td>Status of employment</td>
<td>Permanent</td>
<td>24 (77.4%)</td>
</tr>
<tr>
<td></td>
<td>Contractual</td>
<td>7 (22.6%)</td>
</tr>
<tr>
<td>Membership to FST</td>
<td>Member</td>
<td>16 (51.6%)</td>
</tr>
<tr>
<td></td>
<td>Non-member</td>
<td>15 (48.4%)</td>
</tr>
<tr>
<td>Religion</td>
<td>Muslim</td>
<td>5 (16.1%)</td>
</tr>
<tr>
<td></td>
<td>Non-Muslim</td>
<td>26 (83.9%)</td>
</tr>
</tbody>
</table>

*No. of participants – whole numbers represent actual number of participants; values in % and enclosed with parenthesis represent % groupings of participants per qualification
**DOST – Department of Science and Technology
***PHISGOC – Philippine Southeast Asian Games Organizing Committee
In the negative responses from questions 1–7, it is noticeable that from an initial high 90% deficient competency ranking, this diminished to only near 40% after the TOT session. This indicates improvement in a number of participants moving from deficient competency level to basic level as a result of the TOT session. However, it is apparent from the results that the knowledge-practice competency can still be improved through the actual conduct of more training with practical experience in the use of concepts and principles in the HHACCP FSS.

In addition to the pre- and post-assessment for competency conducted in the TOT, a detailed theoretical examination was administered by the international SME who is authorized to provide internationally recognized certification for trained trainers in the HHACCP FSS. Completion of the training and attainment of an examination rating of 76% and above qualifies the participant for certification. One hundred percent (100%) of the participants passed the examination and were certified as trained trainers on the HHACCP FSS.

**TOI Curriculum**

The TOI curriculum consisted of the developed teaching aids of the trained trainers of the TOT. These included Teaching Aid 1 (Introduction: Halal Awareness Food Program for Halal Caterers), Teaching Aid 2 (Fundamentals of Shariah in Halal Assurance System), Teaching Aid 3 (Food Safety Assurance Plan in Halal Certification), and Teaching Aid 4 (Halal Compliance Critical Control Points). These teaching aids were modeled based on the outline of the teaching modules previously presented by the international SME, indigenized through the incorporation of information from Philippine Food Law and National Standards on Halal, including samples of Halal food and beverage manufactured and sold by local Philippine industries in Teaching Aid One.

Indigenization of the teaching aids introduced in Teaching Aid One consisted of the presentation of nine Halal certifying bodies operating in the country (Desiderio 2020). The teaching aid also detailed RA No. 10817, which pertains to the development and promotion of the Halal industry of the country. The teaching aid also named four Philippine National Standards documents related to Halal, which was developed by the Department of Agriculture through the Bureau of Fisheries and Standards (BAFS) in an effort to promote and enhance the Halal industry of the country (PNS BAFS 101:2016; PNS BAFS 102:2016; PNS BAFS 103:2016; PNS BAFS 139:2015). Teaching aids two to four were all adapted from the general concepts of Halal, Shariah law, Halal assurance plan, and Halal compliance critical control points presented by the international SME. To ensure the quality, safety, and purity of Halal food throughout the food supply chain, understanding of the concepts and implementation of food safety systems such as Halal assurance system and Halal compliance critical control points that implement food safety programs such as HACCP and its prerequisite programs and Halal requirements along the food chain were imperative (Kamaruddin et al. 2012).

### Table 5. Comparison of TOT pre- and post-assessment results (n = 31 trainee respondents).

<table>
<thead>
<tr>
<th>Query items on knowledge assessment for Halal-HACCP</th>
<th>Pre-assessment</th>
<th>Post-assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>% negative answers*</td>
<td>% negative answers*</td>
<td></td>
</tr>
<tr>
<td><strong>Identification of basic concepts and principles of Halal-HACCP Food Safety System, including:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Hazards and haram relevant to the food chain</td>
<td>38.7</td>
<td>0</td>
</tr>
<tr>
<td>2. Hazards and haram CCPs for HHACCP Plan</td>
<td>38.7</td>
<td>0</td>
</tr>
<tr>
<td>3. Five preliminary steps for HHACCP Plan development</td>
<td>48.4</td>
<td>6.5</td>
</tr>
<tr>
<td>4. Pre-requisite programs for HHACCP Plan</td>
<td>45.2</td>
<td>0</td>
</tr>
<tr>
<td>5. Seven principles of HHACCP Plan development and implementation</td>
<td>54.8</td>
<td>9.7</td>
</tr>
<tr>
<td><strong>Background experience or practice in the evaluation of concepts and principles of Halal-HACCP Food Safety System resulting from:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Training</td>
<td>87.1</td>
<td>25.8</td>
</tr>
<tr>
<td>7. Training with mock audit practice</td>
<td>90.3</td>
<td>41.9</td>
</tr>
<tr>
<td>8. Additional experience while serving as internal auditor in monitoring of non-compliances of a working HHACCP Plan</td>
<td>93.5</td>
<td>29</td>
</tr>
<tr>
<td><strong>Advance experience in the evaluation of concepts and principles of Halal-HACCP Food Safety System through:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Formulation of corrective actions based on monitored non-compliances of a working HHACCP Plan while serving as internal auditor</td>
<td>96.8</td>
<td>41.9</td>
</tr>
<tr>
<td>10. Implementation of a full audit of a working HHACCP Plan while serving as an external auditor</td>
<td>100</td>
<td>64.5</td>
</tr>
</tbody>
</table>

*% negative answers = total number of negative answers per question / total number of trainee respondents x 100
In the development of these teaching aids, a mock presentation activity was conducted through the guidance of a panel of evaluators headed by the local SME. In this mock presentation activity, the group of trained trainers was oriented on how to present the slides orally through practice presentation to the entire group of TOT participants. Additional inputs of the panel of evaluators related to the content and presentation of the teaching aids were incorporated in the final revision of the materials.

**TOI Participants and Their Competencies**

Table 6 shows the results of the pre- and post-self-assessments for the competency of the TOI participants. The demographics of the 41 participating industry trainees is detailed as follows: 30 were representatives from the industry who were from the various food manufacturers and suppliers, caterers, and foodservice sector, and 11 were members of the FST of PHISGOC. The pre- and post-assessment results of the TOI participants were similar to the trend established in the TOT knowledge-practice competency evaluation. Results of the pre-assessment showed that the majority of the participants have deficient competency with 30–55% lacking the capacity to identify basic concepts and principles of the HHACCP FSS. Moreover, the majority of the participants have limited background experience and advance experience or practice in the evaluation of concepts and principles of the HHACCP FSS, corresponding to about 55–70%.

Based on the post-assessment results, it was shown that the training conducted by the certified trainers was able to improve the competency of the TOI participants in identifying basic concepts and principles of the HHACCP FSS. Based on the negative responses from questions 1–6, it is noticeable that from the high 58% deficient competency ranking, a decrease was recorded to only about 37% after the TOI session. This indicates that a greater number of participants have a basic competency ranking as a result of the TOI. But as an improvement to the skills of the certified trainers to transfer their competency to their trainees, there is a need to provide background experience and advance experience or practice in the evaluation of concepts and principles of the HHACCP FSS.

**Walk-through Audit**

The study was able to perform a total of 16 walk-through audit activities for accommodation dining sites. Fourteen of these sites were led by the deployed trained trainers in NCR and Region 4A, while the 2 sites were led by the international SME assisted by some trained trainers at Region 3. In addition to these sites, the auditing of 17 game events and game sites was also implemented in the areas of North and South NCR and in Region 4A, as seen in Figure 2.

Table 7 summarizes the results of the walk-through audit activities conducted by the certified trainers in all the identified sites in terms of Halal, HACCP, and prerequisite programs compliance indicators. The mock presentation activity was conducted through the guidance of a panel of evaluators headed by the local SME. In this mock presentation activity, the group of trained trainers was oriented on how to present the slides orally through practice presentation to the entire group of TOT participants. Additional inputs of the panel of evaluators related to the content and presentation of the teaching aids were incorporated in the final revision of the materials.

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**Table 6. Comparison of TOI pre- and post-assessment result (n = 30 trainee respondents*).**

<table>
<thead>
<tr>
<th>Query items on knowledge assessment for Halal-HACCP Food Safety System, including:</th>
<th>Pre-assessment</th>
<th>Post-assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Identification of basic concepts and principles of Halal-HACCP Food Safety System, including:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Hazards and Haram relevant to the food chain</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2. Hazards and Haram CCPs for HHACCP Plan</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>3. Five preliminary steps for HHACCP Plan development</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>4. Pre-requisite programs for HHACCP Plan</td>
<td>56.7</td>
<td>10</td>
</tr>
<tr>
<td>5. Seven principles for HHACCP Plan development and implementation</td>
<td>56.7</td>
<td>13.3</td>
</tr>
<tr>
<td><strong>Background experience or practice in the evaluation of concepts and principles of Halal-HACCP Food Safety System resulting from:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Training</td>
<td>56.7</td>
<td>36.7</td>
</tr>
<tr>
<td>7. Training with mock audit practice</td>
<td>56.7</td>
<td>43.3</td>
</tr>
<tr>
<td>8. Additional experience while serving as internal auditor in monitoring non-compliances of a working HHACCP Plan</td>
<td>66.7</td>
<td>43.3</td>
</tr>
<tr>
<td><strong>Advance experience in the evaluation of concepts and principles of Halal-HACCP Food Safety System through:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Formulation of corrective actions based on monitored non-compliances of a working HHACCP Plan while serving as internal auditor</td>
<td>70</td>
<td>36.7</td>
</tr>
<tr>
<td>10. Implementation of a full audit of a working HHACCP Plan while serving as an external auditor</td>
<td>66.7</td>
<td>40</td>
</tr>
</tbody>
</table>

*Data only included number of participants who were able to accomplish pre-assessment and post-assessment forms

**% negative answers = total number of negative answers per question / total number of trainee respondents x 100**
Table 7. Indicators of compliances to Halal, HACCP and prerequisite programs in accommodation sites (n = 16) and game sites (n = 17) in NCR and CALABARZON, Philippines, during 2019 SEA Games.

<table>
<thead>
<tr>
<th>Accommodation and dining sites</th>
<th>% compliance</th>
<th>Game events and sites</th>
<th>% compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Halal compliance indicators</strong></td>
<td></td>
<td><strong>Halal Compliance Indicators</strong></td>
<td></td>
</tr>
<tr>
<td>1. Serving of Halal certified food</td>
<td>81%</td>
<td>1. Serving of Halal certified food</td>
<td>88%</td>
</tr>
<tr>
<td>2. Dining area separation for Halal and non-Halal food</td>
<td>38%</td>
<td>2. Dining area separation for Halal and non-Halal food</td>
<td>41%</td>
</tr>
<tr>
<td>3. Availability of Halal dedicated eating utensils</td>
<td>19%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HACCP compliance indicators</strong></td>
<td></td>
<td><strong>HACCP compliance indicators</strong></td>
<td></td>
</tr>
<tr>
<td>1. Temperature control in food handling</td>
<td>100%</td>
<td>1. Temperature control in food handling</td>
<td>76%</td>
</tr>
<tr>
<td>2. Time control in food handling</td>
<td>69%</td>
<td>2. Time control in food handling</td>
<td>71%</td>
</tr>
<tr>
<td><strong>Prerequisite programs compliance indicators</strong></td>
<td></td>
<td><strong>Prerequisite programs compliance indicators</strong></td>
<td></td>
</tr>
<tr>
<td>1. Pest control</td>
<td>56%</td>
<td>1. Food protection</td>
<td>100%</td>
</tr>
<tr>
<td>Facility sanitation and maintenance</td>
<td>56%</td>
<td>2. Employee health, hygiene, and practice</td>
<td>47%</td>
</tr>
<tr>
<td>Employee health, hygiene, and practice</td>
<td>56%</td>
<td>3. Facility sanitation and maintenance</td>
<td>41%</td>
</tr>
<tr>
<td>2. Allergen control</td>
<td>31%</td>
<td>4. Food source control</td>
<td>24%</td>
</tr>
<tr>
<td>Food source control</td>
<td>25%</td>
<td>5. Proper handwashing, adequate supplies, and use of gloves</td>
<td>18%</td>
</tr>
<tr>
<td>Control of supplies and raw materials</td>
<td>19%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food protection</td>
<td>19%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Restroom sanitation and maintenance</td>
<td>13%</td>
<td>Pest control</td>
<td>18%</td>
</tr>
<tr>
<td>Proper handwashing, adequate supplies, and use of gloves</td>
<td>13%</td>
<td>Allergen control</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Restroom sanitation and maintenance</td>
<td>18%</td>
</tr>
</tbody>
</table>

*% compliance of audited sites = total number of sites showing compliance per indicator / total number of accommodation or game sites audited x 100
audit and walk-through audit experienced by trained
trainers can be considered a tool to reinforce knowledge-
competency skills developed during the TOT (O’Sullivan
and Bruce 2014). It was evident that for both games
and accommodation dining sites, the Halal compliance
indicators observed by the trained trainers were mainly
the service and availability of Halal-certified food, with
recorded 81–88% of the sites cited as compliant. The
trained trainers also observed the separation of dining
areas and dedicated cutleries for Halal and non-Halal
food. The availability of prayer rooms in game sites and
Halal certification of accommodation sites were also
listed under Halal compliance indicators by a number
of trained trainers. The two latter observations were not
pertaining to Halal food safety and, therefore, were not
listed in Table 7.

In terms of HACCP CCP compliance, trained trainers
noted 100% compliance for temperature control and 69%
compliance time control in food handling by food services
in accommodation/dining sites. There were only 71–76%
compliances recorded in time and temperature controls
in food handling in game sites, given the difficulties
in maintaining these controls in these areas relative
to the accommodation/dining sites. For prerequisite
programs, the trained trainers observed that pest control,
food protection, employee health, hygiene and practice,
and facility sanitation and maintenance for games and
accommodation dining sites were primarily practiced.
Other prerequisite programs implemented to a lesser
degree in the sites audited that were noted by the trained
trainers included proper handwashing, supplies and proper
use of gloves, allergen control, cleaning and sanitation
of serving facility, food source control, and restroom
sanitation and maintenance.

In general, Halal enhancement of the food safety checklist
of PHISGOC involved adding of check items pertaining
to segregation of Halal from non-Halal items relative
to personnel handling the food, storage, utensils and
food contact surfaces, labeling, facility sanitation and
maintenance, and transport and service of food products.
The pretext of the enhancement was that the food to be
served was pre-arranged by PHISGOC Catering Team to
be prepared and delivered to the sites as Halal certified
and, therefore, the auditing would be more on maintaining
its Halal integrity in its food service.

Halal Integrity aims to sustain the Halal status of a
food product in a specific Halal food supply chain
(Soon et al. 2017). The stakeholders in a typical Halal
food supply chain process are sequentially integrated
as manufacturers, transport operators, warehouse
operators, distribution centers, as well as final retailers
or vendors (Vorst 2006). Previous studies argued that the
risks involved in the Halal supply chain will increase
the possibility of the food products turned from Halal to
non-Halal (Khairulzaman et al. 2013). Identified risks
associated with this type of transformation in the present
study were: 1) cross-contamination because of lack of
proper segregation of Halal with non-Halal items; and
2) the improper and unhygienic handling and storage of
food products leading to deterioration and spoilage, which
were all considered in the enhanced food safety checklist
of PHISGOC.

CONCLUSION

The knowledge-practice competency-building sessions
on HHACCP FSS were able to improve the competency
ratings of the TOT and TOI participants, from deficient
to basic competency levels. These improvements were
particularly true in the knowledge level competency
aspect involving the identification of basic concepts and
principles of the HHACCP FSS. Further, the trained
trainers were able to identify conformance indicators
for Halal, HACCP, and its prerequisite programs during
the walk-through audits in actual sites where food was
provided during the 2019 SEA games. The improvements
in practical experience in the form of mock audits and
advanced forms of audits as internal or external auditors
were noted to still be lacking. It is important to emphasize
that implementation of mock audits and walk-through
audits can improve competency to a proficient level
ranking by reinforcing knowledge and skills given in
training as applied in actual practice. It is recommended
that the fundamental learnings from this knowledge-
practice competency building be used as groundwork for
other HHACCP FSS implementation of future sports event
management requirements.

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STATEMENT ON CONFLICT OF INTEREST

The authors certify they are not directly affiliated or related with any organization or entity with any financial or non-financial interest in the subject discussed in this manuscript.

REFERENCES


