



ASLI QoL 2022



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10th AMER International Conference on Quality of Life
Shangri-la Rasa Sayang, Malaysia, 16-17 Mar 2022



Challenges on the Implementation of Cook-Chill System in School Foodservice

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Abstract

This paper aims to identify the challenges of the cook-chill system implementation in school foodservice. In this qualitative approach, data were gathered through interviews with food contractors in seven different school in Selangor. Three issues, including a lack of awareness about the cook-chill system, inadequate management, and lack of training, were discovered using qualitative content analysis (QCA). The informers believed the system was better suited for airlines or hospitals than school foodservice operations, which produced a large volume of meals everyday. This study could contribute a better understanding on the complexity of the cook-chill system, particularly for the school foodservice.

Keywords: School foodservice; cook-chill system; challenges; implementation

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DOI: <https://doi.org/10.21834/ebpj.v7i19.3265>

1.0 Introduction

Over the past few years, there has been a worldwide trend toward eating outside of the home. Parallel to this development, there has been a growth in the number of different food preparation methods, including sous vide, cook-freeze, and cook-chill. The cook-chill system is part of technology for food producers in the food industry. Globally, the cook-chill system is widely used in catering businesses such as hotels, restaurants, fast-food restaurants. In addition, many places where a large number of foods are served in a short period due to the convenience and time-saving advantages. Not only that but the cook-chill system was also applied in school foodservice. Generally, the cook-chill system involved the technology where the meals are cooked, pre-plated, sealed, and rapidly chilled in the central kitchen or in-house kitchen. The prepared meals are placed in closed carts and transported to the places. Before serving, the items have to be reheated to the appropriate temperatures. The system shows a significant positive impact on the environment, society, and economy as it provides safe and nutritious foods.

The cook chill production system is a significant advancement in prepared foods technology that provides consistent quality in every batch, at every location, while decreasing preparation and serving labour (McClelland & Williams, 2003). Cook-chill, unlike any other technology now on the market, can deliver a high level of quality and freshly cooked flavour. Using a cook-chill production method, the food producers generate vast amounts of consistent "just cooked fresh" dishes. This extends the shelf life of products while also lowering

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food and labour expenses and ensuring high-level as well as safe food handling. The application of this system can also provide convenience and safety with the retention of nutritional content (Sebastiá, Soriano, Iranzo, & Rico, 2010). On the contrary, there are certain disadvantages, such as a costly initial investment in cook-chill equipment, space constraints, a high level of staff training, and the risk of food illness if the cook-chill method's process, procedures, and rules are not followed. Besides, this system required investing time in research and development as well as educating kitchen workers before employing the cook-chill approach because there are no shortcuts in designing, developing, cooking, and preparing foods (Kim & Shanklin, 2006).

In Malaysia, cook chill system only found used at inflight catering even though the implementation of a cook-chilled food production system is claimed to be one of the most effective and viable means for foodservice operations. As food safety is one of the main concerns of the food industry and food producers especially in school foodservice to ensure safe and adequate food for consumption that prevents the spread of foodborne diseases, which can be fatal to people and students, therefore, there is a need to introduce a cook-chill system in schools. This system also might reduce food waste and operational costs. In addition, the cook-chill system implementation is vital for the effectiveness and strategic improvement of the food safety culture for food contractors in school foodservice production. Thus, it is significant to embrace safe, and nutritious meals in schools because it is a measure to improve students' nutritional intake.

To date, there is a lack of studies focusing on the challenges of implementing the cook-chill system in school foodservice. Therefore, this study aims to bridge the gap by exploring the challenges on the food contractor in their decision to used cook chill system in their operation, due to immense food safety is recognized as the biggest problem among school canteens in this country.

2.0 Literature Review

2.1 Cook Chill System

In the 1960s, the cook-chill foodservice system was a revolutionary alternative in foodservice organizations. Based on cook-chill foodservice systems, the foods are produced and refrigerated ahead of time for service, then held in inventory before being consumed. Besides that, the demand for this type of ready-to-eat fast meal produced by the food catering industry outside the home has expanded dramatically in recent years. The cook-chill systems are scalable, allowing leverage of existing labor to boost operational capabilities and production capacity without sacrificing food quality, consistency, or safety (Kim & Shanklin, 2006).

The ability to cook and blast chill food has become a feature of cooking, making its way from mass production to restaurant kitchens. Cook and blast chill food production can be applied to nearly every cooking technique, and blast chilling can be a requirement for food safety in some food preparation. High-tech appliances that save time and energy have made this capability a feature of cooking.

2.2 Cook Chill System and Implementation of cook-chill system at school foodservice

Numerous studies on cook-chilled have been conducted from both an operational and scientific perspective, according to the literature. Academic academics have paid considerable attention to decision-making. When it comes to investment returns, expected expenses, and additional values, the selection process employed by foodservice directors who chose a traditional system appears to be significantly different from the approach used by directors who chose cook-chilled systems (Henroid, Mendonca, and Sneed, 2004). Briefel, Crepinsek, Cabill, Wilson & Gleason, (2009) revealed that, the cook-chilled method, inconsistencies in food quality related to time and temperature were noticed more frequently than in the conventional system. However, the different is due to the lack of knowledge among the school foodservice personnel in maintaining the quality and safety of the products.

Kim and Shanklin (2006) discovered that the decision process used by foodservice directors who chose a conventional system vs a cook-chill system differs significantly, as it deals with return on investment, projected costs, and more. According to Yusof et al. (2018), the implementation of a cook-chill food production system has been considered an effective and viable means for school foodservice operations in decreasing costs and increasing productivity.

2.3 Challenges of implementing cook-chill system at school foodservice

Cook-chill is a volume food production, whereby cooked food is rapidly cooled and vacuum packed for chilled storage, such as cook tanks, blast or tumble chillers, and vacuum clippers. For cook-chill system implementation, it is necessary to consider the cost of equipment and utensils that need to be used and the space for the equipment. According to some headmasters, primary school canteens are operated by individuals or small enterprises and these small enterprises usually have less capital investment or just enough to run the operation (Yusof, Zahari, Abdullah, Ghani & Abdullah, 2018).

The second barrier to implementing a cook-chill system at school foodservice is the lack of personnel knowledgeable about the cook-chill system. The school canteen personnel have limited knowledge about food safety and food operations due to their poor educational background (Yusof et al., 2018). Food safety research pointed to the significance of an educated and trained workforce, but training and knowledge alone do not assure safe food handling by employees (Green, 1992; Henroid, Mendonca & Sneed, 2004; Sneed, Strohhahn, Gilmore, & Mendonca, 2004).

Another obstacle to implementing the cook-chill system is that the workers need to apply food safety practices, especially those responsible for preparing the cook-chill products. Additionally, food safety issues are associated with temperature abuse which many cook-chill products experiences (Muñoz, Sonar, Bhunia, Tang, Barbosa-Cánovas & Sablani, 2019). Furthermore, the time and temperature of food during the rapid chilling and cold storage process need to monitor to ensure food safety. All chilled foods are vulnerable to temperature abuse during distribution, display, and storage. Therefore, temperature abuse must to minimized (Briefel, Crepinsek, Cabill, Wilson & Gleason, 2009).

3.0 Methodology

A qualitative research approach was applied in this study based on an interpretivism perspective for the researcher to understand the phenomena from an individual viewpoint about the challenges of implementation cook-chill system at school foodservice. Selangor was selected as a pilot area to be studied due to Klang Valley being commonly known as the largest rapid growth of population and is located in the center of Peninsular Malaysia. The permission to conduct the study was submitted to the UiTM Research Ethics Committee. Data collection commenced following ethical approval (Ethical protocol reference: REC/12/2021 (MR/1025). The interview consisted of 6 structured questions to explore the participants' views that required further clarification. The questions for the interview are developed based on the research study conducted by Yusof, et al. (2018). The study objectives would have influenced the interview questions to ensure the data collected is trustworthy and usable in addressing the research questions.

The interview processes began with identifying potential candidates or informers among the food contractors at school canteens in few locations such as Shah Alam, Puncak Alam, Petaling Jaya, and Klang. Potential informants were contacted by WhatsApp after collecting their contact information from the school clerk and they were asked if they were interested and willing to participate in the study. Interested candidates were asked for contact information, and an interview was scheduled at their convenience. Each informer was informed and asked to participate in the interview via WhatsApp video call prior to the interview, which lasted approximately 30 minutes. Three qualitative content analyses (QCA) factors were discovered. Data collection was conducted from November to December 2021. For the Malay-speaking food contractors, the information was transcribed in Malay then translated into an English version. Both versions of transcribed interview sessions are evaluated by the informers to ensure the trustworthiness and validity of data collection.

Besides that, a panel of cook chill system specialists assessed the interview questions prior to completing the pretesting qualitative data collecting. The transcribed interview data was sent to food contractors for verification. Atlas.ti Software has been used for the data analyses. After the seventh interviews, no new codes emerged, and saturation was observed. Evidently, the interviews were stopped at 7 informers as the data showed clear evidence of saturation point, thus, there is no need for further interview. Initially, a total of 20 codes were generated, however, after amendments and discussions, the new codes were decreased to 17 due to similarities and redundancy among the codes. Based on the analysis, four themes emerge: can the cook-chill method be implemented, obstacles of implementation, food contractor acceptability level, and worker acceptance.

4.0 Results

4.1 Informers' Profiles

This section explains the profiles of seven (n=7) informers who participated in this study. The Malay informers have at least two years of company experience in school canteen operations. It is important to note that some informers agreed with the implementation of the cook-chill system. Therefore, their understanding and point of view are important in profiling the food contractors' behavior toward the cook-chill system. Moreover, majority of the informers had five to six workers who prepared food at the school canteen. The informers' details are tabulated in Table 4.1.

Table 4.1. Informers' profiles

Informers	Gender	Ethnic	Company's Experience
Informer 1	Male	Malay	21 years
Informer 2	Male	Malay	3 years
Informer 3	Male	Malay	12 years
Informer 4	Male	Malay	15 years
Informer 5	Female	Malay	8 years
Informer 6	Female	Malay	2 years
Informer 7	Female	Malay	13 years

Table 4.1 presents the breakdown of the informers' demographic profile. Generally, all informers were Malays, consisting of 43% (n=3) females, and 57% (n=4) males. For the company's experience, there were 43% (n=3) who had 1 to 10 years working experience at school canteens, while 43% (n=3) also had 11 to 20 years' experience as food contractors. Only one, 14% (n=1) had an experience of more than 20 years, which was informer 1.

4.2 The School Food Contractor's Knowledge on Cook-Chill System

To obtain deeper understanding of food contractors on the cook-chill system, the analysis focused on the following research question: *What are the school food contractor's knowledge with regard to cook-chill system?* To add clarity to the research question, the following four main interview questions were created to guide the study:

Table 4.2. Main Interview Question 1

No.	Main Interview Questions
1	What do you know about the cook-chill system?
2	What do you think about the cook-chill system?
3	Do you know of any organization that implement the cook-chill system?
4	What do you think about the future of our school canteen operation if cook-chill system is to be implemented?

4.2.1 Knowledge on Cook-Chill System

The first theme identified in the responses is knowledge about the cook-chill system. All informers never heard about cook-chill system before. After a little explanation on the cook-chill system, they become familiar with it. The result showed that a few informers could explain about the cook-chill system. Some of the responses were as follows:

“The cook-chill is cooked food and then cooled. Afterwards, the food was heated before being served to the students.”

(Informer 1)

“What I understand from the cook-chill system is that food is prepared earlier.”

(Informer 2)

“According to my understanding this system is good to implement because it simplifies the work, but the superiors do not encourage it.”

(Informer 3)

Consistent with literature, the findings indicated that the informers understand that cook-chill system is a system, whereby food is prepared earlier, and subsequently the cooked food is cooled. Nevertheless, they understand about the system after it was explained by researcher. This is the evident where they have limited knowledge and might be due to their poor educational background as they were among the small medium entrepreneurs.

4.2.2 Suitability to be Implemented

All informers gave their own opinion about the cook-chill system, whether it is possible to implement at their school canteen, with some indicating negative responses. Examples of the responses were:

“We better prepare the ingredients and cook it ourselves.”

(Informer 1)

“This system is not suitable for implementation in school canteens.”

(Informer 4)

“This system is not suitable for implementation in school canteens.”

(Informer 6)

On the other hand, there were some informers who mentioned that the cook-chill system could be implemented. However, it depends on the school authority’s decision. For instance, some of the responses were as follows:

“To me, it depends on the management of the canteen whether to implement this system or not. It may be feasible in international schools.”

(Informer 2)

“It depends on the school and number of students in the school.”

(Informer 5)

Moreover, there is one food contractor who indicated the following feedback:

“This system is acceptable for implementation in schools.”

(Informer 7)

Overall, it showed that some of the food contractors actually could accept the cook-chill system, but some disagreed. It might be due to less exposure of the system among them. Not only that, they also highlighted the canteen personnel management also could influence the implementation of the system. As lack of knowledge on the system based on previous interview question, it might influence the disagreement on the implementation among them.

4.2.3 Knowledge on the Organization that Implement the Cook-Chill System

The informers were asked whether they can give an example of any organization that implemented the cook-chill system. Some informers provided satisfactory answers, as indicated below:

“Yes, Brahim’s Airline Catering and Secret Recipe used this system.”

(Informer 2)

“This system is normally implemented in airlines, for example, Brahim’s Airline Catering.”

(Informer 5)

Nevertheless, the majority of them could not provide an example and revealed that they did not know any organization that implemented the cook-chill system. For instance, some of the responses were:

“I think many people practice this cook-chill system, but I am not sure which organization.”

(Informer 1)

“This is the first time I heard about this system. Therefore, I do not know any examples of organizations that implement this system.”

(Informer 3)

From the above responses, again, it clearly indicated that the majority of informers had lack of knowledge of organizations that implement the cook-chill system.

4.2.4 The Cook-Chill System Benefits

Most informers gave similar responses to this question. The majority of them stated that the advantage of cook-chill system was to simplify the process of food preparation. Most of the answers indicated the following:

“I am not sure what are the advantages of this cook-chill system because I do not practice it in my school canteen. Perhaps, the

advantage is that it simplifies the process of food preparation.”

(Informer 1)

“The advantage of this system is that it simplifies the preparation work.”

(Informer 3)

“The advantage of this system is that it simplifies the process of food preparation and saves time.”

(Informer 5)

Furthermore, there was one informer who gave a different opinion, as indicated below:

“The advantage of this system is that it can improve the quality of food and maintain food safety.”

(Informer 2)

All responses showed that the majority of food contractors realized that the cook-chill system could provide them with benefits, even though they were not using the system in their school canteens. After understanding the cook-chill system from the information given by the researchers, they are able to explain the benefits of the system even though they have a lack of knowledge and exposure of this system.

4.3 Challenges of Implementing Cook-Chill System at School Foodservice

The following analyses were based on data gathered from the interviews relating to the second research objective on the challenges in implementing cook-chill system at school foodservice in Selangor. Details of the questions are tabulated in Table 4.3.

Table 4.3. Main Interview Question 2

No. Main Interview Questions	
1	What are the challenges in implementing the cook-chill system at your school canteen?
2	What is your perception toward the implementation of cook-chill system at school canteen?

4.3.1 Potential Implementation of the Cook-Chill System

There were various answers from the informers on this part. Each of them gave a different point of view, which included the following:

“It is not impossible to implement this cook-chill system. This is because nowadays people would like something easy for them. Furthermore, when we take food from outside, we will get low profits.”

(Informer 1)

“In my opinion, it is impossible for Sekolah Kebangsaan Telok Gadong to implement this system. However, it is not impossible for other schools to implement this cook-chill system.”

(Informer 2)

“It depends on the Ministry of Health to approve this system.”

(Informer 3)

“This system is unsuitable for implementation in school canteens.”

(Informer 5)

“This system will not be implemented in school canteens.”

(Informer 4)

However, there was one informer who did not answer the question, as indicated below. It might be due to the poor knowledge about the system.

“It is also possible for those who take ‘frozen food’.”

(Informer 7)

Overall, every food contractor had their own opinion about the cook-chill system. Several food contractors revealed that this system was not suitable to be implemented in schools and require the school authority’s permission. They are still preferring with their conventional food preparation techniques for the meal to be served to the students. Permission from the government authorities also become the main concerns as the system is still not implemented in all school canteen in Malaysia.

4.3.2 Challenges of the Implementation

All informers gave various responses to the challenges, as indicated below:

“It depends on ourselves. The challenge is profit, whereby when we take food from outside, we have to pay a commission to the food provider. Therefore, we do not make much profit. In addition, I do not think that the employee’s knowledge is a factor hindering the implementation of the cook-chill system.”

(Informer 1)

“The hindering factor is due to the students’ standard of living in this school, which is relatively low. Most students attend the school with only a penny. Additionally, another factor is the high cost for implementing this system.”

(Informer 2)

“The factors hindering the implementation of this system are in terms of volatile raw material prices.”

(Informer 3)

“The main factors are high cost and health factor of students who receive the food.”

(Informer 5)

“The main factors are food storage space and high cost.”

(Informer 6)

“There are no influential factors, however, need to observe the level of food storage and food temperature, and to maintain food hygiene.”

(Informer 7)

From the above analyses, all the food contractors were aware of the challenges in implementing the system. Few factors were highlighted. The profit was important to them in order to sustain the business using the system. In addition, the ability of the students to buy food also becomes a major issue due to students' cost of living and it may be related to family income. Students from poor and low family incomes will have problems buying food. Implementation of the system will increase the cost in terms of facilities, and space for food storage besides concern on food hygiene.

4.3.3 Acceptance Level by Food Contractors and Workers

On the acceptance level of the cook-chill system, the majority of them showed that they had slightly lower acceptance toward it as many of them rated 3 to 5 over 10 for the system. They also believed that their workers could accept and follow the cook-chill system if it is implemented at the school canteen. However, informer 6 stated that her workers could not accept this cook-chill system unless they have adequate equipment. From the above analyses, there was low acceptance of the system. Again, lack of knowledge and exposure lead to such responses.

5.0 Conclusion

Overall, there was a lack of knowledge among the majority of the school food handlers on the cook-chill system in this study. Besides that, there is also a lack of exposure to the system among them. Even though there are many advantages to the system, nevertheless, it is important for the food handlers to have a good knowledge and exposure to the system. Therefore, it is a need to ensure the food handlers have a basic knowledge and exposure to the cook-chill system before it can be implemented. Thus, efforts from authorities are needed in order to implement the system, especially in school foodservice. In addition, the challenges to the implementation could be lesser if there is support from experts related to the system, and the school's authority. The findings of this study may also become a part of an addition to the literature in related studies especially in Malaysia context.

6.0 Limitations for Future Research

As this study focuses only on schools of foodservice in Selangor, therefore, the research findings could not be generalized as a whole. Secondly, there is a lack of literature pertaining to the cook-chill system related to schools' canteens, particularly in Malaysia. Thus, this study could be the initial research and foundation in the area of the states. As this study is done using the qualitative method, it is suggested for future studies use the quantitative approach in order to get widen the scope of information. Moreover, the selected informers for this study were only based on limited locations in Selangor. Therefore, for future research, investigation with a larger sample from other Malaysian states, or in different locations could help in possible validation of the findings.

Acknowledgement

The author would like to thank the participating schools for facilitating this research by enabling access to the informers. This research was supported by the Universiti Teknologi MARA, Selangor Branch under Research Grant (DUCS), 600-UiTMSEL (PI. 5/4) (046/2020).

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