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การจัดการบริการอาหารผู้ป่วยโรคติดเชื้อโคโรนาไวรัส 2019: สถาบันบำราศนราดูร

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บทคัดย่อ

โรคติดเชื้อโคโรนาไวรัส 2019 (COVID-19) เป็นโรคติดเชื้อที่เกิดจากกลุ่มอาการทางเดินหายใจเฉียบพลันรุนแรง (SARS-CoV-2) การระบาดใหญ่ของโรคติดเชื้อโคโรนาไวรัส 2019 ได้รับการยืนยันผู้ป่วยรายแรกนอกประเทศจีนมายังประเทศไทย ในวันที่ 13 มกราคม 2563 ซึ่งในประเทศไทย สถาบันบำราศนราดูรเป็นโรงพยาบาลระดับตติยภูมิ สำหรับดูแล รักษา กักกัน ผู้ป่วยโรคติดเชื้อที่สำคัญ และเป็นศูนย์กักกันสำหรับผู้ป่วยที่อยู่ระหว่างการสอบสวนโรคติดเชื้อร้ายแรง บทความนี้มีวัตถุประสงค์เพื่อแบ่งปันประสบการณ์เกี่ยวกับการจัดการบริการอาหารสำหรับผู้ป่วยโรคติดเชื้อโคโรนาไวรัส 2019 จากสถาบันโรคติดเชื้อที่ได้รับการรับรองมาตรฐานในประเทศไทย

การศึกษานี้เป็นการทบทวนหลังการปฏิบัติงานพบว่า การจัดการบริการอาหารต้องปฏิบัติตามมาตรฐานด้านสุขาภิบาลอาหาร มาตรฐานอาหารปลอดภัย และมาตรฐานโภชนาการ ซึ่งสถาบันบำราศนราดูรปฏิบัติตามแนวทางด้านอาหารและโภชนาการของไทยและสากล เพื่อให้การจัดบริการอาหารมีความปลอดภัยและผู้ป่วยโรคติดเชื้อโคโรนาไวรัส 2019 ได้รับพลังงานและสารอาหารที่เหมาะสม การศึกษาครั้งต่อไปควรศึกษาแนวทางปฏิบัติในการสนับสนุนการจัดการบริการอาหารผู้ป่วยโรคติดเชื้อโคโรนาไวรัส 2019 รวมทั้งโรคที่เกี่ยวข้องกับระบบทางเดินหายใจ และศึกษาการพัฒนาระบบบริการอาหารในโรงพยาบาลในสถานการณ์ฉุกเฉินทางสาธารณสุขเพื่อเป็นแนวทางในการปฏิบัติต่อไป

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Food Service Management of COVID-19 Patients: Bamrasnaradura Infectious Diseases Institute Experience

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ABSTRACT

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The COVID-19 pandemic was confirmed to have reached Thailand on 13 January 2020, when the country made the first confirmation of a case outside China. In Thailand, Bamrasnaradura Infectious Disease Institute (BIDI) is a tertiary care hospital for significant infectious diseases and is the quarantine center for patients under investigation of deadly infectious diseases. The purpose of this paper is to share the experience with the management of nutrition services for patients with COVID-19 from an accredited infectious diseases institute.

This study was a retrospective analysis of the After-Action Review. The results showed that food service management should be guaranteed with food sanitation, food safety, and nutrition standards. Therefore, the BIDI managed food sanitation, food safety, and nutrition standards according to the guidelines by Thai and international guidelines and routinely practice these standards to ensure food safety and adequate nutrition intake for patients with COVID-19. In addition, this is the first paper on BIDI food services since the COVID-19 pandemic in 2019. Future research is suggested to develop a more specific guideline to support in food service management of COVID-19 patients and other respiratory infectious diseases.

Key words: Food Service Management, Food Sanitation, COVID-19 Patients

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Introduction

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It was first identified in December 2019 in Wuhan, China, and has resulted in an ongoing pandemic. It is highly affecting routine living all over the world.[1] The COVID-19 pandemic was confirmed to have reached Thailand on 13 January 2020, when the country made the first confirmation of a case outside China.[2]

In Thailand, Bamrasnaradura Infectious Disease Institute (BIDI) is a tertiary care hospital for significant infectious diseases and is a quarantine center for patients under investigation of deadly infectious diseases.[3] Healthcare professionals include doctors, nurses, pharmacists, medical technologists, radiologists, and nutritionists who work as a multidisciplinary team. Additionally, food service is an integral part of the treatment process.[4]

Food service management during this pandemic is a new challenge for nutritionists. Fundamentally, we are advised to follow the standard guidance for fighting against COVID-19 infection and transmission by a guidebook for infection control in hospitals.[5] Nutritional management for disease prevention includes personal hygiene and cooking area, environmental management and waste handling, equipment and utensils, raw material purchasing, storage, cooking, food delivery, cleaning, and microbiological examination.

Nutritionists applied food sanitation in the hospital for implementation and the Thai Dietetics Association has recommended guidelines for managing hospital diets during the COVID-19.[6,7] The food service management needs to be guaranteed with food sanitation, food safety, and nutrition standards.[6-9] There are seven standards for food sanitation for hospitals including, preparation/cooking area, food/drinking water and beverage, equipment and utensils garbage and wastewater management, toilet facilities, food handler, and surveillance system for food and utensil safety.[6,7] Food safety guideline was performed according to the Centers for Disease Control and Prevention (CDC)'s recommendations.[8]

Finally, the BIDI followed nutrition standards for adult inpatients that are provided by the Department of Health, Ministry of Public Health.[9] Therefore, we are pleased to share how to follow and manage the food sanitation, food safety, and nutrition standards for patients with COVID-19 from an accredited infectious diseases institute.

Materials and Methods

In this After-Action Review (AAR), the data collected by the Division of Nutrition, BIDI was reviewed. This research had been officially approved by the Ethics Committee on Research in human subjects of BIDI. (Document No.SO51h/63_Exempt)

Results

Part 1: Food sanitation, food safety, and nutrition standards are explained as follows:

1. Food sanitation for hospital[6,7]

1) Preparation/cooking area

A. All areas must be clean and tidy, adequate lighting, and not close to the garbage receptacle or wastewater treatment system.

B. Wall and ceiling must be durable, smooth, non-absorbent, clean, and washable surfaces of a light color.

C. Cooking table and wall surrounded stove must be made from durable, non-absorbent, and easily cleanable materials. The table must be at least 60 cm above the floor.

D.The area is maintained free from flies by using a wire screen.

E. Adequate ventilation shall be provided above the cooking area with exhausted hood, ducts, fan, and filters, which should be always maintained clean.

2) Food, drinking water, and beverage

A. Canned food and beverage must have a registered FDA or TIS food number.

B. Raw or fresh food must be wholesome, unadulterated from approved sources. Fresh food must be washed and cleaned before cooking and storing. Food must be kept separately according to their types, stored either at least 60 cm above the floor or in the refrigerator.

C. Canned food and beverage must be in good conditions, stored at least 30 cm above the floor.

D. Dried food must be kept in a separate clean area. The food shall be stored on the shelf at least 30 cm above the floor.

E. Adequate cold room or refrigerator to store fresh/raw food shall be provided.

F. Cooked food must be kept or covered in a clean food-grade container, placed at least 60 cm above the floor.

G. Food transported to patients must be contained in a closed carriage.

H. Drinking water, beverage, and fruit juice must be fit for human consumption, stored in a clean and covered container placed at least 60 cm above the floor.

3) Equipment and utensils

A. All utensils must be made of non-toxic and non-corrosive materials, and easily cleanable

B. Washing utensils must be separated for infectious and non-infectious patients.

C. Proper washing technique of three steps used, washing with detergent, rinsing with clean tap water, and sanitizing by chlorine or hot water. The washing facilities should be placed at least 60 cm above the floor.

D. Proper dishwashing machines shall be used for washing, sanitizing, and drying all utensils.

E. Spoons and forks must be stored with handles up or laid down neatly in a clean and covered container. During transport to patients, the utensils must be covered.

F. All utensils used for patients should be kept in a reverse position (bottom-up) in a clean container or basket placed at least 60 cm above the floor. During transport to patients, the utensils must be covered.

G. Cutting board must be in good condition without any crack or pit. The board must be used separately for cooked and raw food and covered while it is not being used except when the kitchen has a pest protection system.

4) Garbage and wastewater management

A. Garbage bin must be leakproof, non-absorbent, vermin-proof, and covered-container. Plastic bags must be put inside the bin.

B. All drains must be in good condition and shall convey liquid waste from the kitchen or washing facilities through the wastewater treatment system. The liquid waste or wastewater should not discharge directly to a public sewer.

C. Grease interceptors should be in good condition, preferably employed at washing facilities, and properly maintained before discharging to a public sewer.

5) Toilet facilities

A. Toilet facilities must be clean, well ventilated, with adequate water supply. The toilet should be located separately from food preparation, storage, cooking, and washing areas. Handwashing facilities are required within or adjacent to toilet rooms.

B. Adequate toilet and handwashing facilities shall be provided for food handlers.

6) Food handler

A. Food handlers must wear clean uniforms or suitable protective clothing including short or long sleeves clothes.

B. Food handlers must wear uniforms with a white apron and hair covering. Food handlers shall be healthy, free from diseases transmitted through food, water or equipment, and skin infection. The food handler is required to carry out an annual physical examination.

C. Food handlers must have good personal hygiene during handling food. Proper utensils must be used during preparation or serving food to minimize hand contact

7) Surveillance system for food and utensil safety

A sampling of food (2 ready-to-eat food) and utensil (2 samples) must be carried out for microbiological examination. The positive samples should have < 10^6 CFU/g for food, and < 10^3 CFU/1 utensil/4 inch.[2] The examination results should not be more than 2 months before the approval of certification.

2. Food Safety

Generally, the coronaviruses have poor survivability on surfaces, there is likely a very low risk of spread from food products or packaging. The CDC and WHO suggests that food should be handled and prepared safely, including putting raw meat and seafood separate from other foods, perishable foods are kept in the refrigerator, and cooking meat to the appropriate temperature to kill harmful germs including COVID-19.[8,10]

3. Nutrition Standards for Adult Inpatients

Most of the nutrient goals according to the diet orders by physicians for general and therapeutic diets are based on the Thai Recommended Dietary Intake 2020 (Thai RDI) for adults.[9] Tables 1 and 2 set out targets for specific nutrients that need to be provided by the standard menu for general and therapeutic diets. Menus should be capable of meeting the nutrient goals including energy, protein, fat, and carbohydrate on a daily basis.[9]

Table 1 General Diets[9]

Type of foods	Energy (kcal)	Protein (g)	fat (g)	Carbohydrate (g)
Regular Diet	1,500-2,000	54-75	50-56	225-300
Soft Diet	1,500-1,800	45-68	42-60	188-270
Clear Liquid Diet	800	2	Very low	198
Full Liquid Diet	600-1,000	15-25	6-16	113-200

Table 2 Therapeutic Diets[9]

Type of foods	Energy (kcal)	Protein (g)	fat (g)	Carbohydrate (g)
Regular-DM Diet	1,500-1,800	54-75	60-78	225-300
Soft-DM Diet	1,500-1,800	45-68	50-58	188-270
Regular-Low sodium Diet (Less than 2,400 mg/d)	1,500-1,800	54-75	60-78	225-300
Soft-Low sodium Diet (Less than 2,400 mg/d)	1,500-1,800	45-68	50-58	188-270
Regular-Low fat Diet	1,500-1,800	56-90	33-50	225-293
Soft-Low fat Diet	1,500	40-60	27-33	225-244
Regular-high protein Diet	1,500-1,800	67-100	60-78	202-275
Soft-High protein Diet	1,500-1,800	56-90	50-58	169-248

Part 2: Food Service Management of COVID-19 Patients in BIDI

1. Food sanitation for hospital

Food sanitation practices in BIDI were acceptable within the guidelines by the Bureau of Food and Water Sanitation and the Thai Dietetics Association.[6,7] The results are explained as follows:

1) Preparation and cooking area

The building for cooking and utensils madefrom durable, non-absorbent, and easily cleanable materials and protected diseases caused by animals. In the cooking area provided above the cooking area with exhausted hood, ducts, fan, and filters, which should be always maintained clean. This area was defined for food service including; raw material checking zone, raw material preparing zone, cooking zone, serving zone, and cleaning zone. The cleaner cleaned all areas after cooking 3 times per day with detergent and 70% alcohol.

2) Food, drinking water, and beverage

We had planned the food management since January. The food was categorized by nutritionists including; raw food, dried food, cooked food, drinking water, beverage, and fruit juice. Firstly, raw food was separated (meat, vegetable, fruit, and dried food). The raw food was washed fresh food and was cleaned before cooking and storing. Then, the raw food was kept separately according to their types at least 60 cm above in the refrigerator. Secondly, dried food or processed food is kept in a separate clean area, stored on the shelf at least 30 cm above the floor. Thirdly, cooked food is kept or covered in a clean container, placed at least 60 cm above the floor. The food for patients is defined as a regular diet, soft diet, clear liquid diet, full liquid diet, and therapeutic diet. Lastly, drinking water beverage and fruit juice had FDA or TIS food number and selected drinking water canned food and beverage in good conditions. Nutritionists prepared national ready-to-eat, chilled food, and frozen food such as Japanese, Chinese, Halal, and American.

3) Equipment and utensils

There are both utensils for cooking and utensils for patient servicing. First, utensils for patients servicing were made of non-toxic and non-corrosive materials. In the preparation process used separately cutting boards for cooked and raw food. Next, utensils for infected patients were disposable plates, spoons, forks, chopsticks, and covered containers. During transport to patients, the utensils were covered. Equipment and utensils for cooking were cleaned by dishwashing machine of three steps for washing, sanitizing, and drying all utensils and washed all utensils with detergent, rinsing with clean tap water, and sanitizing by hot water.

4) Garbage and wastewater management

First of all, food waste management was performed by using a garbage bin with leak-proof, non-absorbent, vermin-proof, covered-container, plastic bags were put inside the bin and defined time to collect the garbage. Next, all drains were in good condition, shall convey liquid waste from the kitchen, and washing facilities through the wastewater treatment system.

5) Toilet facilities

The toilet is located separately from food preparation, storage, cooking, and washing areas. Handwashing facilities were available for food handlers within toilet rooms. The cleaners cleaned the toilet 3 times per day with detergent and 70% alcohol. Importantly, nutritionists inspect the cleanliness regularly.

6) Food handler

Firstly, before working, nutritionists checked the personal hygiene of the nutrition workers and the body temperature before entering the kitchen which must not be over 37.5°C.[1] The workers wore clean uniforms, suitable protective clothing such as sleeves clothes apron and hair covering, surgical mask, long nails and painting were not allowed, and hands were washed hygienically. A worker who has a higher normal range for body temperature or has been diagnosed with respiratory disease is ordered to stay home until recovery. Secondly, plastic gloves were used during handling food, and nutritionists and workers washed hygienic hands after handling foods. Social distancing was practiced by staying 1.5 meters away from other people. Talking while working refrained. Lastly, washing hygienic hands, took off the uniform, and took a shower were practiced after working within kitchen areas.

7) Surveillance system for food and utensil safety in COVID-19 pandemic.

All samples were transported to Medical Technology Laboratory in a closed icebox for microbiological analysis and utensil was tested by a nutritionist. Most of the samples did not have excessive numbers of microbiological contamination.

2. Food Safety

Food samples were examined as described above. Perishable foods such as meats, seafood, vegetables, and fruits were stored separately in proper refrigerators. Nutritionists recorded the refrigerators' temperatures daily and reported when the malfunction can be noticed.[8] In order to kill COVID-19, the guideline by the World Health Organization (WHO) recommends heating foods for more than 15 minutes of exposure at a temperature above 56°C was performed and checked by nutritionists.[1,10] Thus, the Division of Nutrition applied food safety recommendations provided by the CDC and the WHO appropriately. Finally, the clinical problems were not reported. Food ingredients used in BIDI were safe.

3. Nutrition Standards for Adult Inpatients

Served foods were prepared and cooked according to the diet orders via a computer program within the institute. The standard menus for general and therapeutic diets were designed as a 14-day cycle based on Thai RDI for adult inpatients and were evaluated for their suitable daily energy and nutrients by using the INMUCAL-Nutrients V.3.0.[9,11] Lastly, the patients' satisfaction with food service was good. The food service complaint was not reported.

4. Food Service Management System of COVID-19 Patients in BIDI

The flow chart was developed as showed in Figure 1. There are 9 basic methods as follows:

1) Menu Planning Method: The standard menus for general and therapeutic diets were designed as a 14 - day cycle based on Thai RDI for adult inpatients.

2) Raw Material Purchasing Method: Nutritionist bought raw materials, including meat, vegetable, fruit, and dried food according to the menu planning cycle.

3) Raw Material Checking Method: The nutritionist checked raw material, including meat, vegetable, fruit, and dried food.

4) Raw Material Chemical Checking Method: The nutritionist randomly selected the samples for chemical checking including formalin in food, sodium hydrosulfite (bleaching agent) in food, borax in food, cleanliness of food contact articles and hands, and pesticide in food.

5) Raw Material Preparing Method: Nutritional workers prepared the raw food was washed fresh food and was cleaned before cooking and storing.

6) Food Ordering Method: Diets were ordered by doctors and nurses inputted the orders into the computer program.

7) Cooking Method: Nutritional workers cooked food according to the menu of the day.

8) Cooked Food Serving Method: Utensils for infected patients are disposable

9) Transferring and Waste Disposal Method: Nutritional workers transported to the wards and food wastes were destroyed by the incinerator.

Discussions

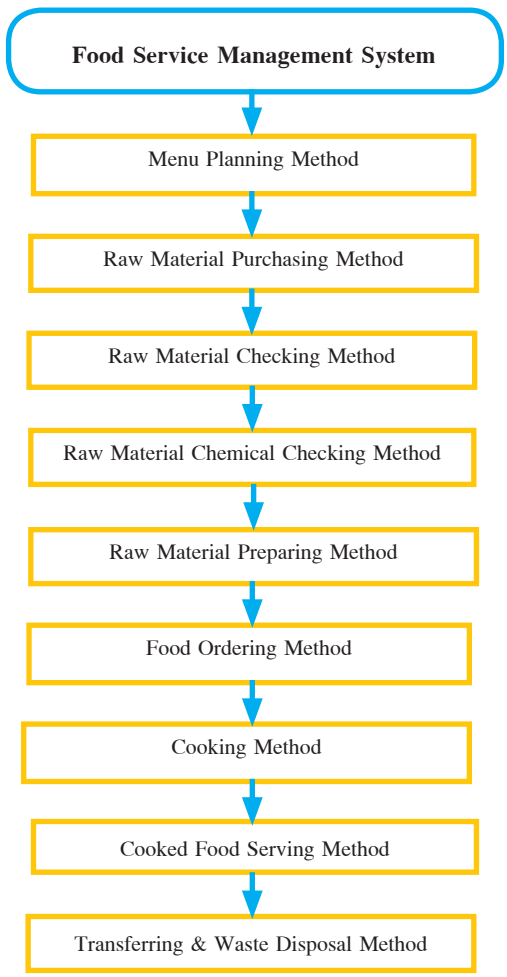
The analysis of AAR includes the practice of food sanitation standard, food safety standard, nutrition standards for adult inpatients, and food service management system of COVID-19 patients in BIDI was discussed. Food sanitation practice has followed the guidelines, including cleaned preparation and cooking area; proper storage of food, drinking water, and beverages; cleaned kitchen equipment and utensils; appropriate disposal of infected food containers; proper management of garbage and wastewater; sufficient toilet facilities; routine body temperature checkup for food handler; suitable protective clothing for staff; handwashing and social distancing practice; and surveillance systems for food and utensil safety. Regarding food safety, the Division of Nutrition applied food safety recommendations provided by the CDC and the WHO correctly.[8,10] Another vital consideration is nutrition standards for adult inpatients. Served foods were met the standard menus for general and therapeutic diets based on Thai RDI for adult inpatients.[9] Food Service Management System of COVID-19 Patients in BIDI was successfully developed and routinely performed. Moreover, neither incidence reported regarding

unacceptable food service nor food poisoning was reported. All COVID-19 patients were served nutritional adequate diets and revealed satisfaction with our food services. None of the staff were infected. Limitations of this study include application of the guidelines was time-consuming. The nutrition standards for adult inpatients can be too broad to practice. Our division routinely scheduled team meetings to reduce these limitations. Future research is suggested to develop more specific food service guidelines for COVID-19 and other respiratory diseases patients.

Conclusion

In summary, to manage the food service during the COVID-19 situation, guaranteeing the food sanitation, food safety, and nutrition standards are necessary. The BIDI followed these guidelines appropriately and must still practice these standards to ensure food safety and adequate nutrition intake for patients with COVID-19.

Figure 1 Food Service Management System of COVID-19 Patients in Bamrasnaradura Infectious Disease Institute (BIDI)



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