The Effect of Health Education on the Attitudes and Practices of Food preservation and storage Case study: Food and Drink Sellers in Tandalty City-White Nile State, 2021 – 2023

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Abstract

Introduction: Food is a substance that comes from animals or plants that are eaten to provide energy. Food contains the nutrition that people need to be healthy. People need protein, fat and carbohydrates. Vitamins and minerals. Study problem: Food and beverage sellers have bad behavior when dealing with food and beverages at the stage of storage and preparation, in addition to not providing ideal storage, lack of cleanliness of refrigerators and dry storage places, and lack of awareness of food storage pests and vector control methods. Study objectives: To assess the impact of health education on food storage trends and practices in the city of Tandalty - White Nile State 2021-2023. Results: The study showed a deficiency in the application of the health culture requirements of the study sample, as well as the presence of an open and full waste dump near the food preparation and sorting places that can attract insects, and when thawing frozen food does not leave enough time.

Keywords: Tandalty City, food sellers, Food Storage, personal hygiene.

المستخلص

مقدمة: الغذاء هو مادة تأتي من الحيوانات أو النباتات تؤكل لتوفير الطاقة، يحتوي الطعام على التغذية التي يحتاجها الناس ليكونوا أصحاء. يحتاج الناس إلى البروتين والدهون والكربوهيدرات. الفيتامينات والمعادن. مشكلة الدراسة: يتسم بائعو المواد الغذائية والمشروبات بسلوكيات سيئة عند التعامل مع الأطعمة والمشروبات في مرحلة التخزين والاعداد، بالإضافة إلى عدم بتوفير التخزين المثالية وعدم نظافة المبردات وأمكنة التخزين الجاف، وعدم الادراك لأفات تخزين الغذاء وطرق مكافة النواقل. أهداف الدراسة: تقييم أثر التثقيف الصعي على اتجاهات وممارسات تخزين الغذاء في مدينة تندلتي – ولاية النيل الأبيض 2021 – 2023. النتائج: أظهرت الدراسة قصورا في تطبيق متطلبات الثقافة الصحية لدي عينة الدراسة، فضلا عن وجود مكب نفايات مكشوفة وممتلئة بالقرب من أماكن إعداد وفرز الطعام يمكن أن تجتذب الحشرات، وعند إذابة الطعام المجمد لا يترك ما يكفي من الوقت للذوبان. الكلمات المفتاحية: مدينة تندلتي، بائعي الاغذية والمشروبات، تخزين الغذاء، النظافة الشخصية.

Background:

Food is material that comes from animals or plants. It is eaten by living things to provide energy and nutrition. Food contains the nutrition that people need to be healthy. People need to eat protein, fat, carbohydrates. vitamins, and minerals to be healthy. Liquids used for energy and nutrition are often called drinks (Abraham S, Benenson, 1995).

More than while many foods can be eaten raw, many also undergo some form of preparation for reasons of safety, palatability, texture, or flavor. At the simplest level this may involve washing, cutting. trimming, or adding other foods or ingredients, such as spices. It may also involve mixing. heating or cooling, cooking, fermentation, or combination with other food (Stroebe, W. 2000).

Food can transmit disease from person to person as well as serve as a growth medium for bacteria that can cause food poisoning. In developed countries there are intricate standards for food preparation, whereas in lesser developed countries the main issue is simply the availability of adequate safe water, which is usually a critical item (Rayza D, M, 2020).

Unsafe food has been a human health problem since history was first recorded, and many food safety problems encountered today are not new. Although governments all over the world are doing their best to improve the safety of the food supply. the occurrence of food borne disease remains a significant health issue in both developed and developing countries. It has been estimated that each year 1.8 million people die as a result of diarrhea diseases and most of these cases can he attributed to contaminated food or water. Proper food preparation can prevent most food borne diseases (WHO, 2006).

Food safety laws and regulations are essential for providing the legal framework for establishing an effective food safety control infrastructure. Whilst also encompassing other consumer protection issues such as fraud, food law serves as a mechanism for formalizing and codifying strategies and policies for food safety. It is an important (Ackah, M., Gyamfi1, 2011). means by which food safety policies are enforced. The purpose of food legislation like food safety policies is to ensure high level of health protection by providing controls along the food production, processing, storage and distribution chain. Food legislation serves to define what is expected as the minimum standard for a large and diverse industry to the consumer, it defines what is safe and wholesome for consumption to the industry, it also specifies the criteria to be met if a manufactured food is to be accepted as safe. It informs producers' and processors of requirements regarding production, processing

1-1 Problem statement and Rationale:

given food (Adjrah, Y., Soncy, 2013).

Food and drinks sellers have bad behavior when deal with food and drinks such as smoking and tobacco. In addition to they are not care about personal hygiene and uncleanness of their place and tools. Also absence of legislation and laws made by sellers. Absence of diagnosis for related food diseases such typhoid fever and intestinal worms. The transfer of harm full substances or disease causing microorganisms from one surface to another by hand, food, contact surface, sponges, cloth towels, equipments utensils (Al-Shabib, N. A, 2015).

methods and product standards and provides the consumer expectations of a

1-2 Questions of the study:

This study aims to answer the following questions:

- What is the relationship of health awareness among sellers with public health?
- Does the application of food storage controls affect the health of the community?
- To what extent do sellers know storage methods and methods?
- To what extent do food sellers care about the personal and local hygiene of food storage places?
- What is the role of the health authorities in guiding food sellers with the correct food storage systems?

1-3 Hypotheses

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This study hypothesizes the following:

- There is a relationship between the health awareness of sellers and the achievement of public health.
- There is a relationship between the application of food storage controls and community health.

Food vendors have proper knowledge of good storage methods.

- There is a relationship between the seller's interest in personal and positional hygiene and food storage.

1.4 Rationale:

- Today, food-related diseases pose a threat to societies (most people eat out). The need to store food in places of sale has also spread for economic reasons.
- Poor awareness and bad behavior of food and beverage sellers through the pre-test.
- The widespread use of food additives without scientific methods may cause chronic diseases such as cancer.

1.5 Objectives of the study:

To evaluate effect of health education on the attitudes and practices of food storage in Tandalty-White Nile State 2018 - 2021.

2 : Storage Hygiene

Proper storage of food is an important part of reducing the risk of food poisoning. Some foods must be stored. In the fridge and eaten within a short space of time; other foods as such as flour, pulses, canned foods and many others last much longer and can be stored at room temperature. But even dried foods have limits on their storage time. So watch out for storage instructions and make sure you always store foods (FAO, 2002):

- In the right place
- at the right temperature
- for the right time

When shopping buy chilled and frozen foods last. Pack them together, ideally in an insulated bag or cool box, and take them home and put them in the fridge and freezer as soon as you can. Keep raw foods (meat, fish, poultry and eggs), fruit and veg away from cooked and ready – to eat foods. Pack foods that bruise or damage easily above other foods. Whenever carrying food outside the home (whether shopping, for barbecues or picnics) avoid putting it in warm places, e.g. near car heaters or in the sun. It's best to use a cool box for perishable foods (WHO, 1996).

Protect milk bottle tops from birds – if they get pecked, discard the milk. Provide a covered holder for the milkman to put bottles in on protective caps for

The bottle tops. Bring the milk indoors and store it in the fridge as soon as you can. If you have other perishable groceries delivered to your home, check that the carrier will store them correctly during transportation and ensure they go in the fridge as soon as they arrive. If you order hot food deliveries check it is piping hot and eat ad soon as you can (FAO, 2012).

2 – 1: Fridge and Freezers

Raw foods such as meat and poultry, may contain microbes that can cause food poisoning, to avoid food contamination, the following must be followed (Hanashiro, A., Morita, M, 2005):

- cross contamination store these foods away from other foods, especially cooked foods and ready to eat foods (such as salads, fruit, cooked meals, cheese, bread, and sandwiches).
- Store them well covered on the bottom shelf of the fridge so they can't drip onto other foods.
- Eggs should be kept in the fridge, in their box.
- Keep prepared could foods in the fridge until it's time to eat them. Dairy products belong in the fridge too. Many foods now need to go in the fridge ounces.
- Never put open cans in the fridge transfer contents into a storage container or covered bowl,
- remember to use within two days.
- Store foods in separate covered containers cover dishes and other open containers with foil or film.
- Don't re use foil or film to warp other foods. Make sure fridge / freezer stays clean in good working condition.
- Use a thermometer to check fridge and freezer temperatures. The coldest part of the fridge should be at no more than +5C and the freezer at 18 C or below.
- Avoid overloading. If a fridge is over- packed with food or iced up it's harder to keep the temperature.
- Clean all internal and external surfaces often especially fridge and door storage compartments. Mop up any spills as soon as they happen.

2 – 2: Cupboards and Storage Places (FAO/WHO .2001):

- Store root vegetables away from other fruit and veg and in dark place.
- Keep pests out. After opening packets of dried foods (e.g flour, rice, and breakfast cereals) reseal them tightly or transfer contents to storage jars.
- Select storage jars and containers with tightly fitting lids always wash and allow them to dry thoroughly after use.
- Check that safety seals are intact when first opening food packaging.
- Store cooking, eating and drinking utensils in cupboards and drawers and clean and tidy these storage spaces regularly.
- Store pet foods separately from human foods.

2 – 3: Storage Time

No food lasts forever however well it is stored. Most pre – packed foods either a 'use by' or ' best before' date Check them carefully, and lock out for advice

on how long food can be kept for once packaging has been opened (Liu, Z., Zhang, G, 2014).

- Use by dates are for highly perishable foods those that 'go off' quite quickly. No one likes to waste food but it can be dangerous to eat foods past their 'use to by 'date.
- 'Best before' dates are for foods with a longer life They indicate how long the food will be at its best quality.

Even if a food within these dates don't eat of it looks, tastes or smells off. Always throw away any fruit or veg that has started to rot and never eat food from rusty or damaged cans, or from leaking cartons. Throw away perishable food that has been left out at room temperature for more than a couple of hours and all food scraps. Other left – overs should be stored in the fridge and eaten within two days.

Check the label on per- packed food to see if it is suitable for home freezing. If so, freeze as soon as possible after purchase. The star making panel on food labels will tell you how long you can store your food, depending on your type of freezer. When freezing home — cooked foods, use clean freezer bags and label them with the date and description of the food, again check your freezer manual or cook book to see how long you can store the foods (Lucca, A., & da Silva Torres, 2006).

2-4: Food Preparation

The germs that cause food poisoning are at greater risk of multi playing and spreading when we are handling and preparing food. At these times we need to take extra care to control food temperatures and avoid cross – contamination

Handling Food

Wash and dry hands thoroughly before handling food When you can use clean kitchen utensils not fingers for handling foods. Keep raw and cooked food apart at all times. In particular keep raw meat fish, poultry and other raw foods away from cooked foods and ready – to – eat foods (such as salads, bread and sandwiches). Wash and dry hands, utensils – including chopping boards and knives – and surfaces thoroughly after preparing raw meat, fish, poultry and other food Ideally use separate chopping boards for raw and cooked foods (Mensah, P, & Yeboah-Manu, D, 2002).

Never put cooked food onto a plate which has previously held these raw foods until it has been thoroughly washed. Do not use the same utensil to stir or serve a cooked meal that was used to prepare

The raw ingredients. Root vegetables such as potatoes, leeks and carrots often have traces of soil on them which can contain harmful bacteria, so wash them thoroughly before use. Don't forget to wash other fruit and veg too, especially

if they are going to be eaten raw. Avoid preparing food for yourself or others if you are ill, especially with vomiting and / or diarrhea (Mosupye, F. M., & von Holy, A, 2002).

Defrosting

When cooking pre- packaged from foods always follow instructions on defrosting / or cooking from frozen. If cooking from frozen allow sufficient time for food to be thoroughly cooked and check it before serving. When defrosting foods make sure they are fully defrosted before cooking, allow food enough time to thaw. Never re – freezer food once it has

Thaw food by placing it on the bottom shelf of the fridge in a container to each any juices. These juices can be contaminated so wash dishes – and hands – thoroughly after use. Only thaw food in a microwave.

Oven if it is to be cooked immediately. To threw very outside the fridge. Put them in a cool place and make sure they are completely thawed before cooking. Lamb and beef (except when minced or rolled) can be eaten rare – but make sure the outer surface is thoroughly cooked to kill any grams on the surface of the meat. Don't cook foods too far in advance. Once cooked, keep foods covered and piping boot (above 63 oc) until it's time to eat them. keep prepared cold foods in the fridge until it's time to eat (Moy, G, Oenema, 1997).

When using a microwave stir foods and drinks and allow them to stand for a couple of minutes to avoid hot or cold spots. Check food is piping hot throughout before serving. Reheat foods until they are piping hot right through. Don't reheat foods more than once.

Cooling

Do not put hot food directly into the fridge or freezer, jet it cool sufficiently foirst, but remember that cooling should be completed within one or two hours after cooking. To speed cooling divide foods into smaller portions, place in a wide dish and stand this in a shallow tray of cold water (Muinde, O. K., & Kuria, E, 2005).

Extra care with special Occasions

Cooking food outdoors, particularly for large groups, can increase the risk of food poisoning. It's harder to keep foods very hot or very cold and to keep everything clean. But with a little extra care barbecues can be safe as well fun. Light the barbecues well in advance, make sure you use enough charcoal and wait until it is glowing red (with a powdery grey surface) before starting to cook.

Keep meats, salads and other perishable food in the is fridge, or in a cool bag with ice packs. until just before you are ready to cook / eat them. serve salads at the last minute. Ideally use separate cool bags for raw meats and ready – to – eat foods. Cool bags for a limited period so cook sooner rather than later.

Before still. if possible, fully pre- cook all poultry and sausages in the microwave or over the take them straight to the barbecue to add the final barbecue flavor.

During cooking, turn food often. If it starts to burn on the outside raise the grill height or reduce the heat of the charcoal (dampen coals slightly or partially close air vents). As always, cook poultry, burgers, pork and sausages throughout – no pink bits in the middle. Keep raw and cooked foods apart at all times. Don't handle cooked foods with utensils that have touched raw meats and don't put cooked or ready – to – eat foods (eg salad and bread) on plates that have held raw meats. keep serving bowls covered to protect them from dust. insect and pets.

Most people who have suffered from suspected food poisoning believe that the culprit food was eaten away (Muyanja, C., Nayiga, L., Brenda, N., & Nasinyama, 2011).

From home. you usually can't inspect the Kitchens when you eat, but there are certain warning signs of poor hygiene (FAO/WHO, 2001).

- Dirty restaurant, dirty toilets, dirty cutlery or crockery the kitchen is likely to be even worse.
- Rubbish and overflowing bins outside the restaurant could attract vermin.
- Staff in dirty uniforms, dirty fingernails, long hair not tied back.
- Hair or insects in food.
- Raw food and ready to eat food displayed together
- Hot food that is not cooked through properly and cold food that is served lukewarm. if you are concerned about what you are served don't eat it.

If you are concerned about the hygiene standards of a restaurant or takeaway, or you have a suspected case of food poisoning, report the case to the environment of your local authority (council). This will help to ensure that other people don't suffer in the same way (Al-Shabib, N. A, 2015).

2-5: Tips for food sanitation

If you prepare or handle food that will be eaten, you must be sure you meet the highest standards of sanitation to make sure the food is safe to eat. While those standards are especially important if you work in a food service operation, they are just as valid in your home kitchen, backyard barbecue, or at an office potluck (Code of Ethics for the health education profession, 2000):

The first part of sanitation involves your own personal hygiene.

- Don't handle food when you are sick.

- Cover cuts, burns, sores and abrasions with a tight dry. antiseptic bandage.
- Shower or bathe daily when you are handling food.
- Keep your clothes clean; wear an apron and change it if you wipe your hands on it or it becomes soiled.
- Keep your hair clean and died back.
- Use soap and plenty of hot water to wash your hands frequently, especially after any act that might contaminate foods.

What sort of acts might contaminate foods? Touching your eyes mouth, ears nose or hair, smoking, eating or drinking, using the rest room, sneezing or coughing, using a tissue or handkerchief, handling raw food (such as unwashed fruits or vegetables or uncooked meat)

Taking out the trash, touching a pet or animal, or touching any dirty surfaces (such as wash clothes, money or credit cards or soiled dishes or linen). If you wear food handler gloves, throw hands as thoroughly as you would wash your bare hands. Gloves can spread germs just as easily as bare hands (Brug, J, Oenema, 2003).

As you prepare food (Rootman, I., Goodstadt, 2001):

- Keep raw food away from ready to eat or cooked food.
- Keep all food away from chemicals.
- Keep cold or frozen out of the refrigerator or freezer for a short time as possible.
- Wash all raw fruits and vegetables before preparation.
- Cover food during preparation.
- When plating food, avoid handling tableware that may touch people's mouths.
- Never plate food that has touched the floor, unwashed hands, or dirty equipment.
- Always use tongs or scoops when necessary. Wear latex gloves and never touch prepared food with your hands.
- Wipe up spills promptly.
- Hold food at proper temperature. some safe holding temperature for food are:
 - Stuffed meats and reheated leftovers: 165 degrees Fahrenheit (74 degrees Celsius) or above.
 - Cold food: 40 degrees Fahrenheit (4 degree Cesius) or below.
 - Beef and other hot food: 140 degree Fahrenheit (60 degree Celesius) or above.

- Fish and poultry: 145 degree Fahrenheit (63 degrees Celsius) or above
- Cooked pork, park products, hamburgers, and eggs 155 degrees Fahrenheit (66 degrees Celsius)
- Clean and sanitise equipment and utensils after each changed use. This includes knives, cutting boards and thermometers storing food properly is also important
- Do not refreeze food after it has thawed
- Always label and date or thawing meats on the lowest refrigerator shelves.
- Store shellfish in the original containers
- Always store food in food- grade containers and food wrap

Most harmful germs thrive in temperature between 40 and 140 degree Fahrenheit (4 and 60 degrees Celsius) This is known as the temperature Danger Zone. However, that number may very slightly as different health department vary that amount by plus or minus 5 degrees. When you prepare food, keep it out of the Temperature Danger Zone as much as possible. Note that the temperature. Whenever a potentially hazardous food (fish, beef, poultry, eggs, dairy products, shellfish, pork, some beans) has been in the Temperature Danger Zone for four hours or more, it should be thrown out (Rayza Dal, 2020).

Salmonella bacteria are the number one cause of foodborne infection in the United States. Typical e. infection can be prevented by cooking food thoroughly and chilling leftovers rapidly. There are two special methods that can help raise the standards of sanitation in your kitchen. The is the two – spoon tasting method. Use a clean spoon to scoop up the item you wish to taste. Pour that food into a second clean spoon and container. This ensures that the food you are preparing (Adjrah, Y., Soncy, K, 2013).

The second method is also one of the most effective ways of preventing the spread of germs; hand washing Wet your hands with hot water and wash your hands and wrists with soap for at least 20 seconds. Scrub your nail brush. Rinse your hands with hot water for 20 seconds using the restroom. Dry your hands using a single- use paper towel or an air dryer. towels can retain germs (Code of Ethics for the health education profession, 2000).

The methods you use for thawing food is also an integral part of safe food handling. There are three safe ways thawing frozen foods; in a refrigerator, under running water, and in microwave. Never thaw frozen food at room temperature. It runs the risk of contamination whenever it is left at room temperature. When thawing frozen food in the refrigerator, remove the food

from the freezer. Thaw only the amount of food you need. Place the Wrapped food in a shallow container the food for thawing.

Make sure the refrigerator temperature is cold o keep the thawing food cooler than 40 degrees Fahrenheit (4 degrees Celsius). Leave the food in the refrigerator until it is totally thawed. large amounts of food or food in boxes can take several days to fully thaw in the refrigerator. when thawing frozen foods under running water, begin by removing only the amount of food you from the freezer (Butterfoss, F.D, 1993).

Make sure the food is tightly wrapped or placed in a watertight container. Place the wrapped food or container under cold running water of 70 degrees Fahrenheit (21 degrees Celsius) or less. Make sure the water doesn't directly touch the think. Leave the food under running water until it is completely thawed.

When thawing frozen food in a microwave oven begin by removing only the amount of food you need from the freezer. Put the food in a microwave setting according to the manufactures instructions. Start the microwave, Thaw food in a microwave oven only in emergencies. Cook food immediately after microwave thawing. Microwave cooking. causes food to lose moisture and reduces its quality (Butterfoss, F.D, 1993).

3 - Design and Methodology of the Study

3 -1: Study design:

An intervention Study among food sellers was conclucted areas curing period from 2018 - 2021. The work was executed in tandality cities.

3 – 2: Study area:

Tandalty: Is capital of Tandalty Locality. is a city located in the White Nile State in Sudan, at an altitude of 422 meters (1385 feet) above sea level, 289 kilometers (179 miles) from the capital, Khartoum, and 88 kilometers (54 miles) from the city of Kosti. It is an important connecting point between western Sudan. Especially the states of Kordofan and central and eastern Sudan. The city of Tandalty is located between longitudes (32:15 and 32:30) degrees east and latitudes (13 and 13:30) degrees north. The locality of Tandalty covers an area of 14,000 square kilometers, Population is about 75000 persons. It has one hospital and 30 health centers. Also it has 2 markets. It surrounded by a lot of villages.

3 -3 Sampling and sample size:

At these study area Tandality city was selected according to the buden of some diseases to food and drinks in Tandality city the sample size was ().

3-4: Plan of work:

Phase (1):

Pre intervention phase: The objectives of this phase is to determine behavior and awareness of sellers of food and drinks.

- To identify the prevalence of food related diseases among sellers and circulators of food and drinks.
- To assess the KAP of sellers and circulators of food and drinks.
- To identify contaminant food and drinks.

Phase (2):

Intervention:

Health education:

Health education programs was conducted in the study area Tandlty, the food handlers or food and drink seller (Tandlty resstaurants).

Health education training:

The objectives of this training by the end of training the period participants (health staff in Tandlty) should be able to:

- Define behavior and other related terms.
- Find out factors affecting human behavior.
- To reach the role of human behavior for prevention of disease.
- Use mass media.
- To practice exercises.

Food storage systems:

- General principles of food storage.
- Food poisoning and food spoilage factors.
- Developments in food storage and quality system.

Duration: of course: two days.

Venue: locality hall. Trainers: three trainees.

4 - Results

Table 1: General Characteristic for Pre intervention (no= 34), and Post intervention [no = 35]

Requirement	Pre intervention [no=34]	Post intervention [no=35]	P. Value
Having a place for storing food	28.41 ± 6.16	25.80 ± 5.75	0.07
Keep all foodstuffs away from chemicals	37.85 ± 8.79	23.71 ± 2.18	0.001
Understand the storage instructions for each	161.21 ±	125.29 ±	0.001
item	25.99	14.41	

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Store raw foods covered in the bottom shelf of	139.61 ±	74.60 ±	0.001	
the refrigerator	27.92	32.98		
Make sure to use canned food within two days	36.47 ± 5.88	45.89 ±	0.001	
of opening the box		07.76		
Ensure that the fridge/freezer is kept clean	99.55 ±	63.71 ±	0.001	
and in good working order	31.01	15.41		
Use tweezers or scoops when necessary	28.03 ± 5.59	15.06 ± 6.61	0.001	
Avoid overloading foods in the refrigerator	28.41 ± 6.16	25.80 ± 5.75	0.06	
After opening the dried food packages, they				
are closed tightly				
Ensure the integrity of the safety seals when	161.21 ±	125.29 ±	0.001	
opening food packages for the first time	25.99	14.41		
Wear latex gloves and do not touch food	28.03 ± 5.59	74.60 ±	0.001	
directly with hands		32.98		
Warning signs of poor hygiene:				
Reuse tin foil to smear other foods	28.41 ± 6.16	45.89 ±	0.001	
		07.76		
Dirty restaurant, dirty cutlery or utensils	36.47 ± 5.88	45.89 ±	0.001	
		07.76		
Overflowing garbage containers outside the	99.55 ±	63.71 ±	0.001	
restaurant can attract insects	31.01	15.41		
Staff in dirty uniforms, dirty nails, and long	28.03 ± 5.59	15.06 ± 6.61	0.001	
hair				
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5: Discussion:

- The current study showed that the average levels of knowledge and awareness of the workers in food stores of food storage requirements increased significantly compared to the period before the study, but the average level of knowledge and behavior in dealing with refrigerated food decreased.
- The student also concluded, through analysis and observation, that there is good knowledge and awareness to ensure that the outer surface of the food is cooked well to kill any grams on the surface of the meat, and the workers do not cook the food before a very long time, with the need to keep the food covered until it is time to present it to the customer, and there are good practices To keep foods in the refrigerator until it is time to serve them.

The current study showed the presence of staff wearing dirty uniforms, dirty nails, and noticeably long hair, as well as the presence of garbage and overflowing containers outside the restaurant that can attract insects, and when defrosting frozen food, it is not left enough time to thaw.

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