

## Patients' Evaluation of Causes of Hospital Food Waste in Surgical Wards

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### ABSTRACT

**Background:** The Food and Agricultural Organization (FAO) defines food waste as food fit for human consumption that is thrown away, whether it has been held over its expiration date or has been allowed to expire. Food waste has drawn a lot of attention recently and is increasingly recognized as the root of a number of detrimental repercussions, including problems with health, the economy, society, and the environment. **Objective:** The current study aimed to evaluate the causes of hospital food waste in surgical wards as mentioned by patients.

**Patients and methods:** *Design:* A descriptive exploratory research design was used. *Setting:* The study was carried out in surgical wards of two hospitals, AL-Hussein and Bab-ELSharia University Hospitals, Egypt. *Subjects:* A convenient sample of 161 adult patients from both genders who agreed to participate in the study. *Tools:* Three tools were used to collect data; Patients personal data, Rate of food waste questionnaire and Acute Care Hospital Foodservice Patient Satisfaction Questionnaire (ACHFPSQ). **Results:** The participants' ages ranged between <30 and 75 years, 44.1% of them had appetite worse than normal in the hospital and 42.2% said that they had less than usual intake of food in the hospital. About 30.4% of the studied patients said that the hospital food rarely has been as good as they expected, and 31.7% of them said that they never be able to choose a healthy meal in hospital.

**Conclusion:** The research provides a helpful foundation for understanding the meals that patients throw away. The findings reveal a concerning amount of food waste that calls for a determined action by hospital officials. The repercussions of this waste may not only have negative effects on the economy or the environment, but also adverse effects on patients' indirect health. Create a customized, flexible meal reservation procedure based on patient's unique needs, tastes, and dietary requirements raise the quality of the meal.

**Keywords:** Patients' evaluation, Surgical Wards, Hospital food waste.

### INTRODUCTION

Food that is sent to be fed to animals, composting, anaerobic digestion, landfilled or burned with energy recovery is referred to as food waste (FW). This includes food that has been served but not eaten, food that has gone bad, and peels and rinds that are deemed inedible<sup>(1)</sup>.

"Wasted food" refers to food that is handled in a variety of ways, such as shipping to landfills or combustion plants, producing animal feed, composting, anaerobic digestion, or donating it to feed the poor. Plate trash, unfinished cooked food, unsold food from retail outlets, and kitchen trimmings; by-products from food and beverage production plants are a few examples. For food that was not utilized for its original purpose, the EPA prefers the general phrase "squandered food" rather than "food waste" since it indicates that a valuable resource is being wasted, whereas "food waste" suggests that the food no longer has value and must be managed as waste<sup>(2)</sup>.

Risk waste and non-risk waste both exist in hospital waste. Risk waste often comprises pathological, infectious, pharmacological, sharps, chemical, genotoxic, and radioactive wastes. Garbage and other everyday trash created by food remnants and their packaging is considered non-risk waste. Developed nations have well-organized medical waste disposal systems. Segregation, internal transportation, and ultimate disposal are just a few of the operational operations connected to waste disposal that are handled by a well trained staff<sup>(3)</sup>.

The hospital's food service is required to always serve food that is safe and meets the established

requirements for nutritional quality and adequacy, palatability, and temperature from the time it is prepared until it is distributed. Therefore, meals provided throughout the duration of a patient's hospital stay are a crucial component of hospital care and patient recovery<sup>(4)</sup>.

Numerous factors might have an impact on the amount of FW. Inappropriate meal length and scheduling, the inability to choose food as near to mealtimes as feasible, and interruptions during mealtimes, such as rounds by medical staff, can all have a detrimental impact on patient/client happiness and the amount of food consumed. "Providing food to the patient is one thing; seeing to it that it is consumed is quite another. Due to inadequate assistance with self-feeding, a lot of hospitalized patients develop malnutrition. The nursing team is in charge of making sure all patients are fed appropriately and sufficiently<sup>(5)</sup>.

Unsatisfactory communication between the ward-based and catering staff is frequently the source of FW resulting from unserved meals. All healthcare personnel who provide patients with food and nutritional care have a responsibility to efficiently manage and prevent FW. Responsibilities may change in various healthcare contexts. Modern mothers can play a big part in making this happen. All healthcare personnel who are in charge of providing patients with food and nutritional care should have the necessary training and be competent in the following areas: meal planning, food safety, fundamental nutrition, interpersonal skills, collaboration, diversity and equal opportunity, health and safety, and communication<sup>(6)</sup>.

Using staff and patient questionnaires, healthcare facilities should frequently assess how satisfied patients and clients are with the standard of meals and food service. At mealtimes, unbiased, unannounced inspections should be conducted. When tracking plate waste and unfinished meals, it is important to keep in mind that the amount of food wasted might vary depending on the meal (breakfast, lunch, and dinner)<sup>(7)</sup>.

A systematic method known as "sustainable management of food" aims to decrease FW and the effects it has across the whole life cycle, beginning with the use of natural resources, manufacture, sales, and consumption, and concluding with decisions about final disposal or recovery. The EPA seeks to support innovation and emphasize the importance of effectively managing food as a resource. By managing food sustainably, we can reduce costs for companies and consumers, support people who lack enough to eat in our communities, and protect natural resources for future generations. With this strategy, which builds on the well-known "Reduce, Reuse, Recycle" mantra, environmental preservation is seen differently and the effects of FW are more thoroughly acknowledged<sup>(8)</sup>.

In our contemporary culture, food waste is both a rising issue and an unrealized opportunity. In the commercial, institutional, and residential sectors alone, the EPA estimates that 63 million tons of foods were wasted in 2018. Of that waste, about 32 percent was managed using techniques like animal feed, bio-based materials/biochemical processing, co-digestion/anaerobic digestion, composting, donation, land application, and sewer/wastewater treatment. According to EPA estimates, food made up 22% of the total quantity burned with energy recovery and 24% of the total amount of garbage that was disposed of in landfills and combustion facilities in the United States in 2018<sup>(9)</sup>.

Food waste is thought to be worth \$1 trillion annually. According to the United Nations Food and Agriculture Organization, 1.3 billion tons of the food produced for human use each year is lost or squandered. A total of 45% of the food lost or wasted globally comes from fruits and vegetables, followed by 45% from roots and tubers, 45% from fish and shellfish, 35% from cereal, 20% from dairy products, 20% from oilseeds and pulses, and 20% from meat<sup>(10)</sup>.

Transport, storage, preparation, cooking, and consumption at all stages of the food manufacturing process, has the potential to produce FW. Therefore, reducing FW is crucial for hospitals if they want to save money and advance their sustainability objectives. The annual cost of edible plate waste has been calculated at 5.625 million Saudi riyals (\$1.5 million) for 18 Ministry of Health general hospitals in Saudi Arabia<sup>(11)</sup>.

Eight percent of the world's anthropogenic GHG emissions are attributable to food loss and waste. The production, transportation, processing, and distribution

of food, as well as other pre-disposal operations, are responsible for more than 85% of the GHG emissions from FW that is landfilled. In the United States, 24% of municipal solid waste that is dumped in landfills is made up exclusively of FW. This substantial amount of discarded food is a major factor in the about 17% of all anthropogenic methane emissions in the United States that arise from landfills<sup>(12)</sup>.

In Singapore, one of the largest waste sources is FW, which has increased by 20% over the previous ten years. Singapore produced 744 million kg or so of FW in 2019. That is equal to over 51,000 double-decker buses or two bowls of rice per person every day<sup>(13)</sup>.

According to a research conducted in Italy, 41.6% of the food supplied to hospital patients in three different hospitals was wasted. Establishing an individualized meal food service, streamlining and adapting the meal preparation process based on the patient's unique nutritional needs, preferences, and choices, and improving the food service based on customer satisfaction surveys were the preventive measures recommended to hospitals to combat FW<sup>(14)</sup>.

The aim of the current was to evaluate the causes of hospital FW in Surgical Wards from the point of view of patients through: (1) Assessing the causes of hospital FW in Surgical Wards. (2) Assessing the rate of FW. (3) Evaluate the food service patients' satisfaction.

## SUBJECTS AND METHODS

**Design:** The study utilized a descriptive exploratory research design.

**Settings:** The study was carried out in surgical wards of two hospitals, AL-Hussein and Saied Galal Bab EL-Sharia University Hospitals, Egypt.

The setting of the surgical department in Saied Galal in Bab Elsharia contains three departments. The first department called Dr. Mohamed Al-Qardi that contains 4 rooms and 12 beds. The second department, called Dr. Ashraf Abdel Hamid that contains 6 rooms and 20 beds. The last department called Dr. Magdy Mahmoud, which includes 5 rooms and 21 beds. The surgical department in Al-Hussein hospital consists of 4 departments (A, B, D and G). The first surgical department A, consists of 4 rooms and 32 beds. The second department B consists of 4 rooms and 24 beds. The third department D consists of 26 beds. The last department G consists of 4 rooms, 26 beds.

From a central kitchen, the food for each ward is placed into food containers and delivered. Three meals are provided each day; breakfast is delivered between 7:30 and 8:00, lunch is given between 12:30 and 13:30, and supper is served between 18:00 and 19:00. The nurse in charge of each ward places food orders based on the number of inpatients and the prescriptions listed on patients' health records (standard meals or modified meals for specific needs such as hypertension, diabetes, high energy, high protein, etc.). The packaged food portions for breakfast and dinner

are often the same and include bread, cheese, yoghurt, jam, and an additional fruit. Lunch is often a hot meal made up of rice, cooked vegetables, lentils, and cooked poultry or pork. In most cases, an orange, banana, pear, or apple is served with the food.

A convenient sample of 161 adult patients from both genders agreed to participate in the study.

**Data collection tools:** Three tools were used to collect data include:

**The 1<sup>st</sup> tool: Patient's personal characteristics;** It consisted of two parts:

*Part 1:* Demographic characteristics such as age, gender and educational level.

*Part 2:* It included General patient condition which include appetite, period of hospital stay , rate of food intake and the sort of diet .

**The 2<sup>nd</sup> tool:** Patient Interview questionnaire used to assess the rate of food waste , to evaluate the amount of food discarded by using 5-point Likert scale ,the questions was asked regarding the 3 meals breakfast, lunch and dinner , the questions assess consuming the meal from 100% (all/ almost all) to 0% (nothing/ almost nothing). **Scoring system:** Questions were scored from 1-5, one for all, and 5 for nothing.

**The 3<sup>rd</sup> tool:** Acute Care Hospital Foodservice Patient Satisfaction Questionnaire (ACHFPSQ).It has been developed and validated by a foodservice research group in Australia <sup>(15)</sup>. It was designed to facilitate operational quality improvement and has proven a useful tool. The ACHFPSQ contained 29 questions. The first 18 questions related to 6 mutually independent foodservice dimensions.

The foodservice dimensions were number of questions within brackets: Food Quality [7], Meal Service Quality [3], Staff and Service [3], Physical Environment [3], Meal Size [1] and Temperature of Hot Foods [1].

In order to report their responses, patients were given a 5-point scale: always/often/occasionally/rarely/never. A question on overall satisfaction with the foodservice (very good/good/okay/bad/very poor) and an open-ended remark section were also included on the questionnaire. Three extra items, modified from the Resident Foodservice Satisfaction Questionnaire, examined perceptions of hunger and meal amount (always/often/ sometimes/rarely/never).

During meals, nursing personnel distributed and collected the questionnaires. All participants were surgical inpatients who spent at least one night in the hospital. When necessary, nursing personnel assisted patients in filling out the surveys.

**Validity:** By making the tools available to five academic experts in adult nursing (medical surgical nursing) from the Faculty of Nursing, the instruments' validity was put to the test. Expert opinions were rated as agreeable or disagreeable for the tools' relevancy,

clarity, thoroughness, and comprehensiveness. After reviewing their feedback, a final questionnaire was created and used.

**Reliability:** Ten percent of the patients were given the standard questionnaire to complete, and the findings were repeated two weeks later on the same sample, demonstrating the instruments' dependability.

**Pilot Study:** In order to assess the effectiveness, dependability, clarity, and application of the tools, a pilot study including 16 patients, or 10% of the sample size, was conducted. The tools were then modified in light of the findings of the pilot research. As no changes were made to the research equipment, subjects who participated in the pilot study were not excluded from the entire sample.

**Field work:** After receiving official approval to conduct the study, the patients were introduced to the researchers and given a brief explanation of the study's objectives. The participants provided their oral permission. The researchers were present in the study settings three times per week from 9:00 a.m. to 1:00 p.m. for the duration of the study, which lasted three months from the beginning of September 2022 to the end of November 2022. The structured interview questionnaire was completed in around 35 minutes.

**Administrative design:** By presenting an official letter from the Faculty of Nursing, Helwan University, and outlining the research's purpose, the administrators of the study settings at the AL-Hussein and Bab Elsharia outpatient clinics gave their formal consent for the present study to be conducted.

**Assessment phase:** The researchers interviewed each subject individually and clarified the aim of the study, then asked for participation. They met the subject's and filled the questionnaire to evaluate their personal satisfaction about food service.

**Implementation phase:** The data gathering tools were provided in straightforward Arabic to ensure that the subject could comprehend them. The respondents were asked to freely respond on a likert scale and sign their responses in the provided instrument.

**Limitation of the study:** Some patients stated that they did not rely solely on hospital meals when they declined to participate in the study and respond to the questionnaires.

**Ethical considerations:**

**The individuals who accepted to participate in the study are given an explanation of the study's goals and objectives by the researchers. Participants were made aware that they had the option to participate or not in the study and that they may opt out at any time. They were also told that the data collected would only be used for research purposes and would be destroyed**

following data analysis. The study was approved by the Ethics Board of Helwan University.

**Statistical analysis**

The collected data were introduced and statistically analyzed by utilizing the Statistical Package for Social Sciences (SPSS) version 20 for windows. Qualitative data were defined as numbers and percentages. Quantitative data were tested for normality by Kolmogorov-Smirnov test. Normal distribution of variables was described as means and standard deviation (SD). Spearman's correlation was utilized to examine the relationship between two variables. P value  $\leq 0.05$  was considered to be statistically significant.

**RESULTS**

**Table (1)** shows that the subjects ages ranged between <30 and 75 years and 43.5% Of them between age group: 46–60 years old (31.1%) between 30–45 years old. Other Personal characteristics for this group included the following: 50.3% were females, 42.9% had office work. 52,8 % of the studied subjects were in Bab Elshareya hospital, 44.1% of them had appetite Worse than normal in the hospital and 42.2% said that they had Less than usual intake of food in the hospital. In relation to hospital stay, 28.6% of them stayed from less 3-4 weeks while 26.7% stayed from 1-2 months. Concerning the sort of diet, 34.2% had restricted diet for medical reasons and 24.2% had standard /diabetic/ cardiac menu.

**Table (1): Frequency and percentage of the sociodemographic characteristics of the studied subjects (n=161).**

Items	No	%
<b>Age</b>		
Mean $\pm$ SD	2.62 $\pm$ 0.864	
Range	<30-75	
<b>Gender</b>		
Male	80	49.7
Female	81	<b>50.3</b>
<b>Employment</b>		
Technical work	62	38.5
Office Work	69	<b>42.9</b>
House wife	30	18.6
<b>Unit</b>		
Bab Elshareya	85	<b>52.8</b>
Al-Hussein	76	47.2
<b>Appetite</b>		
Normal	65	40.4
Better than normal	25	15.5
Worse than normal	71	<b>44.1</b>
<b>Hospital Stay</b>		
Less than one week	21	13
1-2 weeks	33	20.5
3-4 weeks	46	<b>28.6</b>
1-2 months	43	<b>26.7</b>
More than 2 months	18	11.2
<b>Normal Food Intake</b>		
Unchanged	57	35.4
More than usual	36	22.4
Less than usual	68	<b>42.2</b>
<b>Sort of Diet</b>		
Standard/Diabetic/ cardiac menu	39	<b>24.2</b>
High protein/High energy menu	37	23.0
Restricted diet for medical reasons	55	<b>34.2</b>
Don't know	30	18.6

**Table (2)** illustrates the rate of food waste related to the three meals of the studied subjects, 36% of them consume all the breakfast, 31.7% consume 75% of it. In relation to lunch, 29.2% of the studied subjects eat only 50% of their meal while 24.2 % did not consume their lunch. Concerning the dinner, 30.4% of the studied subjects consume all the dinner while 32.3% consume 75% of it and 21.7% consume 50% of the meal and discard the same percentage. When asked the patients why they discarded food and whether they brought in food from home or from another external catering service 56.6% said yes and 43.5% said no.

**Table (2): Frequency and percentage distribution related to rate of food waste of the studied subjects (n=161).**

Question		100% All/almost all		75% About 3/4		50% About half		25% About 1/4		0% Nothing/ almost nothing	
		No	%	No	%	No	%	No	%	No	%
<b>In which percentage did you consume your meal?</b>	<b>Breakfast</b>	58	36	51	<b>31.7</b>	35	21.7	8	5	9	5.6
	<b>Lunch</b>	10	6.2	27	16.8	47	<b>29.2</b>	38	23.6	39	<b>24.2</b>
	<b>Dinner</b>	49	30.4	52	<b>32.3</b>	35	<b>21.7</b>	17	10.6	8	5
<b>Brought food from home or another external catering service</b>	<b>Yes</b>	91	<b>56.6</b>	-----							
	<b>No</b>	70	<b>43.5</b>								

**Table (3)** reveals that, 30.4% of the studied patients said that the hospital food rarely has been as good as they expected, 31.7% of them said that they never be able to choose a healthy meal in hospital, in relation to the way of cooking the vegetables 27.3% of the studied patients rarely like it. While, 36.6% of them said that sometimes the meals taste nice. In relation to the variety of the menu, 6.2% only said it is always enough to choose meals that they want to eat. When they asked about the meals has excellent distinct flavours, 35.4% said it is rarely occurred and 33.5% of them said that it is often the meat is tough and dry.

**Table (3): Food wasted according to the opinions of the patients regarding food quality and foodservice\* (n=161).**

Food service dimension/Independent statements	Always		Often		Sometimes		Rarely		Never	
	No	%	No	%	No	%	No	%	No	%
<b>Food Quality</b>	16	9.9	19	11.8	38	23.6	49	<b>30.4</b>	39	24.2
<b>Q1: The hospital food has been as good as I expected.</b>										
<b>Q5: I am able to choose a healthy meal in hospital.</b>	9	5.6	11	6.8	45	28.0	45	28.0	51	<b>31.7</b>
<b>Q8: I like the way the vegetables are cooked.</b>	11	6.8	21	13.0	43	26.7	44	<b>27.3</b>	42	26.1
<b>Q9: The meals taste nice.</b>	9	5.6	20	12.4	59	<b>36.6</b>	42	26.1	31	19.3
<b>Q13: The menu has enough variety for me to choose meals I want to eat.</b>	10	<b>6.2</b>	20	12.4	48	29.8	43	26.7	40	24.8
<b>Q16: The meals have excellent and distinct flavors.</b>	0	00	20	12.4	43	26.7	57	<b>35.4</b>	41	25.5
<b>Q18: The meat is tough and dry.</b>	30	18.6	54	<b>33.5</b>	45	28.0	23	14.3	9	5.6

\* Acute care Hospital Food Service Patient Satisfaction Questionnaire (ACHFPSQ)

**Table (4)** explains that 31.1%, 30.4% said that it is often the cold drinks and hot drinks are just the right temperature respectively. 23.0% responded that the cold foods were at the right temperature rarely. It also demonstrates that, 28.6% of the studied patients said that it is often the staff who deliver the meals are neat and clean while 39.8% of them said that the always the staff who take away the finished meals trays are friendly and polite. When asked about if the staff who deliver the meals are helpful, 32.9% of them said that they often helpful.

**Table (4): Food wasted according to the opinions of patients regarding meal service quality and staff/ service issues\* (n=161).**

Food service dimension/Independent statements	Always		Often		Sometimes		rarely		Never	
	No	%	No	%	No	%	No	%	No	%
<b>Meal service Quality</b>	40	24.8	50	<b>31.1</b>	31	19.3	25	15.5	15	9.3
<b>Q7: The cold drinks are just the right temperature</b>										
<b>Q10: The hot drinks are just the right temperature</b>	25	15.5	49	<b>30.4</b>	36	22.4	28	17.4	23	14.3
<b>Q14: The cold foods are the right temperature</b>	12	7.5	41	25.5	36	22.4	37	<b>23</b>	35	21.7
<b>Staff Service issues</b>										
<b>Q3: The staff who deliver my meals are neat and clean</b>	40	24.8	46	<b>28.6</b>	36	22.4	21	13	18	11.2
<b>Q11: The staffs who take away my finished meals tray are friendly and polite.</b>	64	<b>39.8</b>	56	34.8	25	15.5	7	4.3	9	5.6
<b>Q15: The staff who deliver my meals are helpful</b>	46	28.6	53	<b>32.9</b>	34	21.2	10	6.2	18	11.2

\* Acute care Hospital Food Service Patient Satisfaction Questionnaire (ACHFPSQ)

**Table (5)** shows that, 31.1% of the studied patients said that the crockery and cutlery are rarely chipped or stained and they also rarely disturbed by the noise of finished meal trays being removed respectively. While, 34.2% of them said that the hospital smelled rarely stop them from enjoyed their meals.

**Table (5): Food wasted according to the opinions of patients regarding the physical environment\* (n=161).**

Food service dimension/Independent statements	Always		Often		Sometimes		Rarely		Never	
	No	%	No	%	No	%	No	%	No	%
<b>Physical environment</b> <b>Q2: The crockery and cutlery are chipped/stained</b>	13	8.1	16	9.9	38	23.6	50	<b>31.1</b>	44	27.3
<b>Q4: The hospital smelled stop me from enjoyed my meals</b>	16	9.9	18	11.2	31	19.3	55	<b>34.2</b>	41	25.5
<b>Q6: I am disturbed by the noise of finished meal trays being removed.</b>	11	6.8	14	8.7	41	25.5	50	31.1	45	28

\* Acute care Hospital Food Service Patient Satisfaction Questionnaire (ACHFPSQ)

**Table (6)** illustrates that 31.7% of the studied patients often like to be able to choose different sized meals and 23.6% said that sometimes the foods are just the right temperature. When they asked whether they receive enough food, 31.7% said they never receive it and 26.1% said they often or sometimes still feel hungry after the meal. In relation to being hungry in between meals, 19.9% of them always feel it. In relation to satisfaction with the food service 23% said that is good while 22.4% of them said that is poor.

**Table (6): Food wasted according to the opinions of patients regarding independent statements\* (n=161).**

Food service dimension/Independent statements	Always		Often		Sometimes		Rarely		Never	
	No	%	No	%	No	%	No	%	No	%
<b>Independent statements/Meal size/Hot temperature</b> <b>Q12:I like to be able to choose different sized meals</b>	29	18.1	51	<b>31.7</b>	43	26.7	27	16.8	11	6.8
<b>Q17:The foods are just the right temperature</b>	28	17.4	35	21.7	38	<b>23.6</b>	30	18.6	30	18.6
<b>Additional questions</b> <b>Q20: I receive enough food</b>	15	9.3	14	8.7	43	26.7	38	23.6	51	<b>31.7</b>
<b>Q21:I still feel hungry after my meal</b>	19	11.8	42	26.1	42	<b>26.1</b>	22	13.7	36	22.4
<b>Q22: I feel hungry in between meals</b>	32	<b>19.9</b>	16	9.9	39	24.2	43	26.7	31	19.3
<b>Overall, how would you rate your satisfaction with the food service</b>	<b>Very good</b>		<b>Good</b>		<b>Okay</b>		<b>Poor</b>		<b>Very poor</b>	
	No	%	No	%	No	%	No	%	No	%
	19	11.8	37	<b>23.0</b>	42	26.1	36	<b>22.4</b>	27	16.8

\* Acute care Hospital Food Service Patient Satisfaction Questionnaire (ACHFPSQ)

**Table (7)** shows that there was a highly statistically significant correlation between age, gender, educational level, hospital stay and sort of diet. Appetite had a highly statistically significant correlation with employment.

**Table (7): Correlation between personal characteristics of the studied patients (n=161).**

Variable	Age	Gender	Employment	Appetite	educational Level	Hospital stay	Sort of diet
Age	-	0.000**	0.625	0.361	0.000**	0.000**	0.000**
Gender	0.000**	-	0.001	0.059	0.000**	0.018	0.436
Employment	0.625	0.001	-	0.000**	0.498	0.334	0.155
Appetite	0.361	0.059	0.000**	-	0.252	0.260	0.101
Educational level	0.000**	0.000**	0.498	0.252	-	0.592	0.102
Hospital stay	0.000**	0.018	0.334	0.309	0.592	-	0.000**
Sort of diet	0.000**	0.436	0.155	0.101	0.102	0.000**	-

\*Correlation is significant at the 0.05 level (2-tailed). \*\* Correlation is highly significant at the 0.01 level (2-tailed).

**Table (8)** reveals that the dimension of food quality has a highly statistically significant correlation with staff service issues and Meal size/food temperature, physical environment has a highly statistically significant correlation with staff service issues.

**Table (8): Correlation between Food service dimensions of the studied patients (n=161).**

Dimension	Food Quality	Meal service quality	Staff Service issues	Physical environment	Meal size/food temperature
Food Quality	-	0.243	0.000**	0.361	0.000**
Meal service quality	0.243	-	0.853	0.059	0.000**
Staff Service issues	0.000**	0.853	-	0.000**	0.498
Physical environment	0.361	0.059	0.000**	-	0.386
Meal size/food temperature	0.000**	0.423	0.498	0.386	-

\*Correlation is significant at the 0.05 level (2- tailed). \*\* Correlation is highly significant at the 0.01 level (2-tailed)

**DISCUSSION**

Food loss includes food waste, which happens when an edible item is not consumed. Examples include food that is thrown out by stores due to unfavorable color or flaws and plate trash that customers abandon. Both locally and globally, food loss (and notably the food waste component) is a subject that is receiving more and more attention <sup>(16)</sup>.

The results of the study revealed that the subjects' ages ranged between <30 and 75 years and less than half of them between age group: 46-60 years old about one third between 30-45 years old. Other Personal characteristics for this group included the following: about half were females ,less than half had office work, more than one third of them had diploma .less than half of them had appetite Worse than normal in the hospital and about two fifth said that they had Less than usual intake of food in the hospital. In relation to hospital stay, more than one quarter of them stayed from 3-4 weeks while about one quarter stayed from 1-2 months. Concerning the sort of diet, about one third had restricted diet for medical reasons and about one quarter had standard /diabetic/ cardiac menu.

This is in accordance with **Shah** <sup>(4)</sup> who claimed that the respondents' ages varied from 18 to 94 and that they were evenly divided between the two age groups: 61 to 94 years old (49.7%) and 18 to 60 years old (50.3%). For this group, additional demographic details included the following: 28.5% of people were jobless, 55.3% had low levels of education, and 58.1% were women (most of these individuals were homemakers).

**Rapo et al.** <sup>(16)</sup> reported that patients staying longer than a month and those whose self-reported intake was lower than usual, respectively, were more dissatisfied with the foodservice, the food in general, and the taste and flavors of the food. This was in contrast to those staying less than a week and those with unchanged or increased intake (i.e., were less likely to report positively). The food quality facet received the most responses from respondents, demonstrating a range of perspectives. Several remarks

focused on the Staff and Service dimension, primarily praising the staff's friendliness. Regarding the surroundings or the caliber of the food services, there were no comments.

In relation to rate of food waste of the three meals of the studied patients , more than one third of them consume all the breakfast, about one third consume 75% of it .In relation to lunch, more than one quarter of the studied subjects eat only 50% of their meal while less than one quarter did not consume their lunch. Concerning the dinner, about one third of the studied subjects consume all the dinner while less than one third consume 75% of it and about one fifth consume 50% of the meal and discard the same percentage. More than half of the patients indicated yes and more than two fifths said no when asked if they brought food from home or another outside catering service and why they tossed food away.

According to **McCray et al.** <sup>(17)</sup>, the side plate was the item that was thrown away the most frequently out of the 41.6% of meals that was provided in the three hospitals. This rate is comparable to the greatest rates found in older and more recent research, the majority of which reported rates between 25% and 40%.

As regards the food quality, the current study revealed that about one third of the studied patients said that the hospital food rarely has been as good as they expected, about one third also of them said that they never be able to choose a healthy meal in hospital, in relation to the way of cooking the vegetables more than one quarter of the studied patients rarely like it.

While more than one third of them said that sometimes the meals taste nice. In relation to the variety of the menu, minority of them only said it is always enough to choose meals that they want to eat. When they asked about the meals has excellent distinct flavors, more than one thirds aid it is rarely occurred and one third of them said that it is often the meat is tough and dry.

The foodservice dimensions with the lowest marks were meal size and food quality. The biggest deviations were found in the questions contained in

these dimensions, indicating that patients' opinions varied. According to **Jonsson et al.** <sup>(18)</sup>, food consumption in a hospital context has been demonstrated to reflect patients' perceptions of the meal's acceptability.

The current study demonstrates that more than one quarter of the studied patients said that it is often the staff who deliver the meals are neat and clean while less than half of them said that the always the staff who take away the finished meals trays are friendly and polite. When asked about if the staff who deliver the meals are helpful, about one third said that they often helpful.

Regarding foodservice, customer satisfaction with the staff and service came close to earning the best possible rating. This shows, for instance, how the patients see the staff's "helpfulness" (Q15). It has been demonstrated that hospital patients frequently express gratitude for the care they get. As indicated by **Fahadullah et al.** <sup>(19)</sup>, patients develop relationships with professionals while simultaneously being vulnerable and dependent on care.

According to **Hartwell et al.** <sup>(20)</sup>, some issues were tied to particular patient categories, such as older patients who could have issues with tough meat (Q18). Second, some of the questionnaire's questions (Q 5, 12, and 13) imply that patients at these institutions had the option to choose from a menu at that time, which was not the case. The larger percentage of missing responses for those particular questions may have been an indication of this. Additionally, tragically, the majority of patients chose not to respond to the question concerning a specific diet, which may have indicated problems with how the question was understood.

According to **Rapo et al.** <sup>(16)</sup>, patients in this Swedish environment had a high level of overall satisfaction with the hospital foodservice. Multiple patient requirements are difficult to meet, and tracking patient satisfaction is essential to maintaining an evidence-based approach in foodservice operations. The ACHFPSQ offered a broad picture of the foodservice industry and identified areas with room for development. It was useful to utilize in a Swedish environment. Patient satisfaction is a complicated metric, though.

## CONCLUSION

The current study analyses potential reasons of food waste while describing it from the perspective of the patient. As a result, the findings provide a helpful framework for understanding the food that patients throw away. According to our findings, there is a concerning amount of food waste that necessitates a determined response from hospital administrators. The

repercussions of this waste may not only have negative effects on the economy or the environment, but also adverse effects on patients' indirect health.

## RECOMMENDATIONS

1. Establish a personalized, flexible meal reservation procedure based on unique requirements, tastes, and dietary restrictions.
2. Enhance food quality based on user satisfaction surveys.
3. Patient feedback is crucial for outcomes research and quality improvement projects because it gives patients a formal forum for feedback and shows them that doctors and other medical professionals appreciate what they have to say.
4. Health care administrators and auditors always look for patient-reported outcomes to get a sense of the structure and quality of care.

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