



SPECIAL ISSUE

Care in Meal Presentation: A Quantitative and Qualitative Analysis of the Effects of Aesthetic Meal Presentation in Healthcare Settings

Stefano Testa¹, Elena Pizzi^{2,3}

1 Registered Nurse, Italy

2 Bachelor School of Nursing, University of Turin, Turin, Italy

3 San Luigi Gonzaga University Hospital, Orbassano, Italy

Findings:

This multicenter pilot study involving 34 participants showed that improving the aesthetic presentation of breakfast was associated with significant increases in meal satisfaction and mood, with differences confirmed by Wilcoxon tests and, largely, by McNemar tests after Holm correction. Food appeal improved only partially, whereas no significant differences were observed in interactions with healthcare staff or caloric intake. Qualitative findings revealed a shift from predominantly absent or negative emotions to positive emotions, particularly joy, cheerfulness, and surprise, together with a more favorable perception of the overall mealtime experience.

Corresponding authors:

Stefano Testa:

testastefano@hotmail.com

Elena Pizzi:

elena.pizzi@unito.it

ABSTRACT

BACKGROUND: Neuroscience has shown that visual stimuli can influence the brain's reward circuits by activating non-homeostatic signals that enhance the desire to eat even after the body's energy needs have been satisfied.

AIM: To analyse, using a mixed-methods approach, the potential effects of an aesthetic enhancement intervention in food presentation on the eating experience of individuals receiving care in healthcare settings.

METHODS: A multicentre single-arm pre-post pilot study (N = 34) was conducted using a mixed-methods approach. The intervention consisted of improving the aesthetic presentation of breakfast without modifying the quality or type of food provided. Outcomes included meal satisfaction, mood, food appeal, dietary intake, and interaction with healthcare professionals.

RESULTS: Quantitative analysis showed significant improvements in meal satisfaction, mood, and food appeal following the intervention. No significant differences were observed in interaction with healthcare professionals. Caloric intake was lower during the intervention period than at baseline; however, this difference was not statistically significant. Qualitative analysis revealed an increase in positive emotions associated with meals and a greater appreciation of the aesthetic aspects of the eating experience.

DISCUSSION: Findings from the mixed-methods analysis suggest that enhancing the aesthetic presentation of food may positively influence several dimensions of the eating experience. However, given the multifactorial nature of the phenomenon and the potential presence of confounding factors, the study showed an inverse trend in caloric intake, although this finding did not reach statistical significance.

CONCLUSIONS: The effects of aesthetics on the brain's reward circuits offer interesting perspectives for improving patients' eating experiences. Despite the limitations of a pilot study, the findings support further investigation into the role of food aesthetics in clinical care settings.

KEYWORDS: *Aesthetics, Food Presentation, Food, Satisfaction, Mood, Food Appeal, Food Intake*

Authors' Address:

C/O Corso di Laurea in
Infermieristica, Università degli Studi di Torino –
AOU San Luigi Gonzaga Regione Gonzole 10
10043, Orbassano (TO) ITALY



Milano University Press

265

Submission received: 08/09/2025

End of Peer Review process: 05/07/2026

Accepted: 27/07/2026



CONTRIBUTO SPECIALE

La cura nel cibo: analisi quanti-qualitativa degli effetti derivanti da una presentazione estetica del pasto nei contesti sanitari

Stefano Testa¹, Elena Pizzi^{2,3}¹ Ricercatore indipendente, Italia² Corso di Laurea in Infermieristica, Università degli Studi di Torino, Torino, Italy³ AOU San Luigi Gonzaga, Orbassano, Italy

Riscontri:

Questo studio pilota multicentrico su 34 partecipanti ha mostrato che il miglioramento estetico della presentazione della colazione è stato associato a un incremento significativo del gradimento e del tono dell'umore, con differenze confermate dai test di Wilcoxon e, in larga parte, dal test di McNemar dopo correzione di Holm. L'appetibilità è migliorata solo parzialmente, mentre non sono emerse differenze significative nell'interazione con il personale sanitario né nell'intake calorico. L'analisi qualitativa ha evidenziato un'evoluzione da emozioni prevalentemente assenti o negative a emozioni positive, soprattutto gioia, allegria e sorpresa, accompagnata da una percezione più favorevole dell'esperienza del pasto.

Corresponding authors:

Stefano Testa:

testastefano@hotmail.com

Elena Pizzi:

elena.pizzi@unito.it

ABSTRACT

BACKGROUND: Le neuroscienze hanno evidenziato come gli stimoli visivi possano influenzare i circuiti della ricompensa, attivando segnali non omeostatici che potenziano il desiderio di mangiare anche quando sono stati soddisfatti i bisogni energetici dell'organismo.

OBIETTIVI: Analizzare, con un approccio quanti-qualitativo, i possibili effetti di un intervento di miglioramento estetico della presentazione del cibo sull'esperienza alimentare delle persone assistite nei contesti di cura.

METODI: È stato condotto uno studio pilota multicentrico pre-post a braccio singolo (N = 34) con un approccio quanti-qualitativo. L'intervento consisteva nel miglioramento della presentazione estetica della colazione senza modificare la qualità o la tipologia degli alimenti somministrati. Gli outcome indagati comprendevano gradimento, tono dell'umore, appetibilità, intake alimentare e interazione con il personale sanitario.

RISULTATI: L'analisi quantitativa ha evidenziato differenze significative a favore dell'intervento negli outcome gradimento, tono dell'umore e appetibilità. Non sono emerse differenze significative per l'interazione con il personale sanitario. L'intake calorico è risultato inferiore durante il periodo di intervento rispetto al baseline, ma il dato non è risultato statisticamente significativo. L'analisi qualitativa ha evidenziato un aumento delle emozioni positive associate al pasto e una generale valorizzazione degli aspetti estetici dell'esperienza alimentare.

DISCUSSIONE: I risultati derivati dall'analisi quanti-qualitativa suggeriscono che un intervento di miglioramento estetico della presentazione del cibo possa influenzare positivamente alcune dimensioni dell'esperienza alimentare. Tuttavia, data la multifattorialità del fenomeno e la possibile presenza di fattori confondenti, lo studio ha mostrato un trend inverso rispetto all'introito calorico, sebbene privo di significatività statistica.

CONCLUSIONI: Gli effetti dell'estetica sui circuiti della ricompensa mostrano aspetti interessanti che potrebbero migliorare l'esperienza alimentare dei pazienti. Pur nei limiti di uno studio pilota, i dati supportano ulteriori approfondimenti sul ruolo dell'estetica del cibo nei contesti clinico-assistenziali.

KEYWORDS: *Estetica, Presentazione, Cibo, Gradimento, Umore, Appetibilità, Assunzione Di Cibo***Authors' Address:**

C/O Corso di Laurea in
Infermieristica, Università degli Studi di Torino –
AOU San Luigi Gonzaga Regione Gonzole 10
10043, Orbassano (TO) ITALY



Milano University Press

266

Submission received: 08/09/2025

End of Peer Review process: 05/07/2026

Accepted: 27/07/2026



BACKGROUND

In the health field, adequate nutrition produces beneficial effects on patients such as reducing hospitalisation times, improving drug response and preventing infections and complications (1–3). However, food intake in clinical-care settings cannot be traced exclusively to nutritional intake. The phenomenon of nutrition is multidimensional, with factors such as education, social influences, and emotional and psychological states shaping individuals' eating behaviour.(4). Neuroscience has shown that eating behaviour is regulated by the interaction of homeostatic and non-homeostatic mechanisms, also activated by sensory and visual stimuli through the reward circuits of the central nervous system (CNS)(4,5). In this process, visual stimuli play an important role since they contribute to the formation of expectations, the activation of reward systems and the preparation of the body for the intake of the meal(1,4).

Starting from these theoretical bases, several studies conducted in the field of marketing and consumer behaviour have observed how the aesthetic component of food can influence the emotions, preferences and eating behaviours of individuals(6–9). Although these evidences have been produced mainly for commercial purposes, they suggest that hedonistic aspects of food may influence some dimensions of patients' dietary experience in health contexts.

The different authors who analysed the process of providing meals and the food experience of patients in the clinical-care setting, focused the observation mainly on the patients' satisfaction of the hospital food service (10–17), on their food intake (10,13,17–19) and on their interaction with the staff(12,16,20). The hedonistic aspects associated with the meal experience are still little explored, although some revisions and Guidelines suggest an attention to the presentation of meals in order to improve the eating experience of patients(2,3,19). Only two clinical trials have examined the effects produced by interventions aimed at improving the aesthetics presentation of meals(17,18), focusing solely on patient satisfaction and dietary intake. Starting from the hypothesis that the mechanisms observed by neuroscience and studies on eating behaviour can also be relevant in care settings, the present study was conceived with exploratory purposes in order to observe which dimensions of the meal experience can be influenced by an intervention to aesthetically improve the presentation of a meal. Alongside the outcomes traditionally investigated in the literature, a mixed-methods

approach was adopted to include mood and emotional state variables, in order to explore those dimensions of the mealtime experience that have so far received limited investigation in clinical and care settings.

PURPOSE

The aim of this study is to analyse, through a mixed quantitative-qualitative approach, the possible benefits that an intervention improving the presentation of food served in care settings may have for patients.

METHODS

Research design

A research protocol was developed to support a pilot, multi center, quasi-experimental study with a single-arm pre-post design and a mixed-methods approach to data collection. (Figure 1).

Independent variable

An intervention aimed at improving the aesthetic presentation of meals, without affecting the selection or quality of the foods served.

Dependent variables

- FOOD and CALORIE INTAKE
- Categorical variables:
 - SATISFACTION
 - MOOD TONE
 - PALATABILITY
 - INTERACTION WITH HEALTHCARE PROFESSIONALS
- Qualitative outcomes:
 - THOUGHTS/OPINIONS
 - EMOTIONS EXPERIENCED

The research project obtained the favourable opinion of the University Bioethics Committee of the University of Turin with Protocol no. 0722873 issued on 23/12/2024.

Sample size

Based on the type of study, the sample number (N) was estimated through a T test, using the Jamovi 2.6.19 version software, based on the following parameters:

- Significance level (α): 0.05
- Test power: 0.80.
- Effect size (es): 0.5



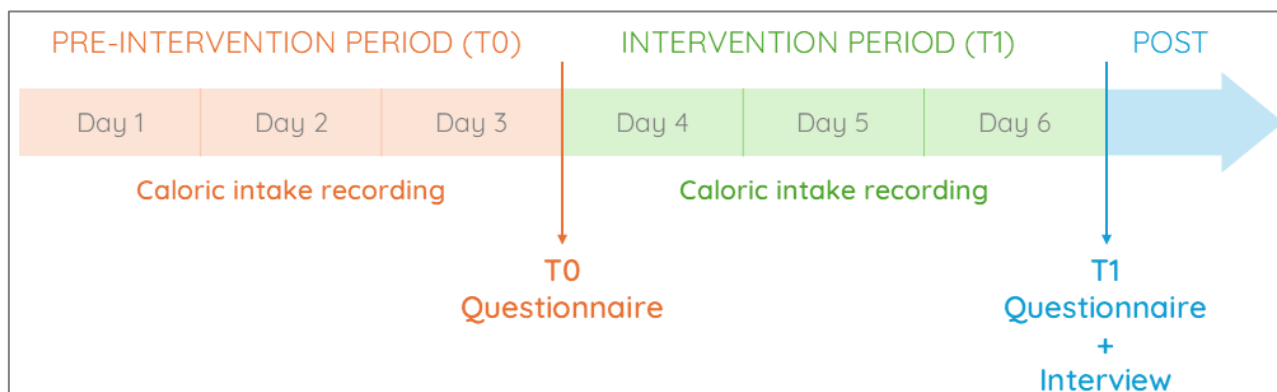


Figure 1. Timeline of the pre-post study design

In view of the limited availability of comparable studies in the literature and the finding of only two trials (17,18) investigating the effect of an intervention on meal presentation, a moderate effect size (0.5) was estimated. Given the exploratory nature of the study, a primary endpoint has not been defined.

The estimated sample size was considered for the overall sample distributed across the three settings, since Residential Health Care Facility (RSA), Hospice and Oncology were considered as different recruitment contexts, used to evaluate the feasibility and transferability of the intervention in heterogeneous care environments. Therefore, no comparative statistical analysis was carried out between the settings, and the analysis remained descriptive. However, restrictive sample selection criteria were adopted in an effort to reduce confounding factors.

Selected population

Although the three care settings involved were intrinsically heterogeneous from a clinical standpoint, particularly restrictive inclusion and exclusion criteria were adopted to limit the influence of potential confounding factors:

INCLUSION CRITERIA:

- Adult patients/guests (>18 years)
- dysphagic and euphagic individuals
- individuals not expected to be discharged before the administration of the final questionnaire and interview (POST-INTERVENTION).
- native Italian speakers or with a good degree of understanding.

EXCLUSION CRITERIA:

- patients with psychiatric disorders / symptoms
- subjects with diagnosed Depression
- individuals with Dementia/Delirium
- subjects with cognitive or memory impairment

- subjects with severe visual impairment
- subjects with gastro-intestinal disorders or chronic gastro-intestinal conditions.
- subjects with intractable nausea/vomiting and a history of recurrent episodes;
- patients receiving enteral nutrition (EN) or parenteral nutrition (PN);
- patients with invasive ventilation (IV) or non-invasive ventilation (NIV);
- subjects who did not provide informed consent.



Selection of the settings

Selection criteria include:

1. interest of the facilities and services in the thesis project;
2. objective feasibility of the trial, based on direct preliminary observation of the context;
3. authorisation to conduct the intervention granted by the heads and directors of the facilities and services

Based on the settings and sample selection criteria, the three settings chosen for the study were:

- RSA (Residential Health care Facility) San Giacomo, Piosasco (TO);
- SCU Medical Oncology, AOU San Luigi Gonzaga, Orbassano (TO);
- Hospice – Valletta Facility, ASL Città di Torino (TO).

Intervention protocol

The intervention was designed with the support of a health care chef and culinary consultant, interviewed in August 2024. The interview suggested that constant communication between the health care chef (CS) and ward staff is essential to deliver a hospital food service aligned with patients' needs and expectations, even though in practice this occurs only sporadically. Menu





development is the result of collaborative work between dietitians and the health care chef, with consideration given to the distribution system, as it affects recipe formulation. Plating should be specified in the recipes, as this enables the creation of a standardised, organised, and reproducible system, regardless of the operator. However, no specific Guidelines exist for plating, and meal presentation in health care settings is entrusted to the health care chef, who applies their expertise to create an appealing presentation while ensuring full compliance with the pre-established recipes.

In conjunction with the health care chef's consultation, an analysis of the meal preparation and distribution systems was conducted in the three settings

- The Residential Health care Facility (RSA) had an in-house meal preparation system (*insourcing*), while the Hospice and Oncology units relied on *outsourcing*.
- The distribution system for the main meals (lunch and dinner) was “*cook-and-chill*” in the RSA and Hospice settings, with portioning performed near the wards using a mobile heated trolley, whereas Oncology used a “*hot-fresh*” system, in which portioning is carried out in the kitchen using special trays designed for a trolley that maintains two temperatures, hot and cold, on opposite sides of the tray.
- In all three settings, breakfast was prepared in-house in the ward kitchens by support staff (OSS)

On the basis of this analysis and the guidance provided by the health care chef, it was decided to intervene only at breakfast, without altering the selection or quality of the foods, as these aspects could not be changed through the recipe formulation. The criteria applied were simplicity, involving few and easily implementable elements; adaptability and replicability across all three settings; and cost-effectiveness.

Secondly, a study was carried out on colours and their influence on eating behaviour. According to the literature, warm colours such as yellow, orange and red stimulate appetite(8,9). A 2019 study involving patients in an internal medicine ward reported increased food intake in the group that received an orange napkin compared with the group that received a white napkin (17). By contrast, a soft, cooler colour such as blue can convey a sense of tranquility(21).

At the end of the study, three components constituting the full intervention were identified and implemented for administration during patients' breakfast:

1. a meal place mat (Figure 2);
2. a cutlery holder;
3. a lotus flower (origami) (Figures 3a–3c).



Figure 2. Final layout of the placemat featuring a dedicated message for the patient.



Figure 3a. Yellow cutlery holder and lotus flower used on the first day of the intervention





Figure 3b. Orange cutlery holder and lotus flower used on the second day of the intervention.



Figure 3c. Red cutlery holder and lotus flower used on the third day of the intervention.

Data collection tools

To detect data on qualitative variables, two tools were developed: a 14-item questionnaire, organised by domains, with a 5-point Likert scale and a semi-structured interview designed to explore participants' opinions and emotions. These two instruments were subsequently validated through a panel of experts and according to a methodology established in the literature. For the quantitative variable of food intake, an existing instrument previously validated in the literature was used.

Expert panel

Six professionals, consistent with the minimum number recommended in the literature (22), were recruited from the following professional categories and were sent a cover letter presenting the project and the validation process:

- Psychologist: 1 expert
- Health care Chef: 2 Experts;
- Speech therapist: 1 expert
- Health care Director: 1 expert
- Nurse: 1 expert.

Questionnaire

The questionnaire (*Annex 1*) was developed to detect differences between the pre-intervention period (T0) and the post-intervention period (T1), regarding categorical qualitative outcomes. Based on the most relevant instruments existing in the literature(23–31), the most pertinent items were selected and adapted to develop the questionnaire.

The first draft of the questionnaire was submitted to the Panel for validation.

Validation of the questionnaire

The validation of the questionnaire was carried out according to the procedure provided by Elangovan and Sundaravel (32) which includes the following phases:

1. CONTENT validity was assessed using the Content Validity Index (CVI) (22). Outcomes (grouped by item) reached the following values:
 - a. Satisfaction: 0.95
 - b. Mood tone: 1
 - c. Palatability: 1
 - d. Interaction with Health care Professionals 0.83

The experts also evaluated the socio-demographic data, deeming them adequate.

2. STRUCTURE VALIDITY: The draft, after content validation, was submitted to the Health Promotion Documentation Centre (DoRS) in Turin for structural assessment. In accordance with the DoRS recommendations, the level of education was added in the socio-demographic section, the Likert-scale response options for questions 5 and 6 were revised to ensure neutral wording and the order of some questions was modified to reduce response set bias.
3. PILOT TEST: the validated questionnaire was administered to a small representative sample of 11 subjects (7 males), aged 56 to 75 years, admitted to the Neuro-Rehabilitation Functional Medicine Unit of AOU San Luigi Gonzaga, Orbassano.
4. CONSISTENCY TEST: The results of the pilot test were analysed through the Jamovi Software (2.6.19 version) from which Cronbach's alpha was obtained (*Table 1*).





Table 1. Internal consistency estimated using Cronbach's alpha, mean, and standard deviation (SD)

DOMAIN	Mean	SD	Cronbach's α
Satisfaction	4.11	1.18	0.963
Mood tone	3.94	1.10	0.896
Palatability	4.24	1.09	0.963
Interactions with healthcare professionals	4.36	0.606	0.813
Overall questionnaire	4.18	0.867	0.955

Fluid and Food Estimation Diagram

Dietary intake was assessed using the Fluid and Food Estimation Diagram (FFED) (33), selected for its simplicity and adapted to record breakfast intake. Over the six-day observation period, the instrument was completed with a distinction between the two phases, T0 and T1.

Semi-structured interview

The semi-structured interview (Figure 6) was developed and validated through a modified Delphi method (Figure 6)(34). Based on the analysis of the theoretical constructs retrieved from the literature, a draft of the questions was developed and submitted to the Expert panel.

For each question in the interview, the Panel assigned a score from 1 to 5, where "1= not at all; 2=little; 3= sufficient; 4=enough; 5=a lot", for each of the following criteria:

- CLARITY
- APPROPRIATENESS
- RELEVANCE
- TOPIC COVERAGE

The cut-off of a mean score greater than or equal to 4 represented the minimum level of consent (80%). The validation process was completed after the second round of evaluation, once the predefined cut-off (>4.6) has been reached.

INTERVISTA SEMI-STRUTTURATA

1. *What is your opinion of the aesthetic appearance of food served in care settings? [Without considering the intervention]*

- a) *What emotions does it elicit?*
- b) *What other aspects should be improved?*

2. *How has your perception of food served in the health care setting changed after the intervention?*
3. *What emotions did the intervention evoke?*
4. *What information should nurses/ healthcare professionals gather in order to understand a patient's dietary expectations and needs?*

RESULTS

Sampling

The study period started at the end of November 2024 and ended on January 2, 2025. Observation in each setting lasted six days, including three consecutive days of intervention, so as to identify a more robust correlation between the intervention and the expected effects compared with a single day of observation.

Subjects were selected in accordance with the inclusion and exclusion criteria defined in the research protocol. Of the 41 participants eligible for the study, 35 provided informed consent after receiving appropriate information. Of these 35, one participant died during the observation period. To achieve the estimated sample size, oversampling was necessary in the Oncology setting, as illustrated in Figure 4.

Data Anonymisation and Masking

Each enrolled participant was assigned an anonymisation code composed of three letters identifying the respective setting, followed by three digits. Anonymisation lists were therefore created and used throughout the data collection process:

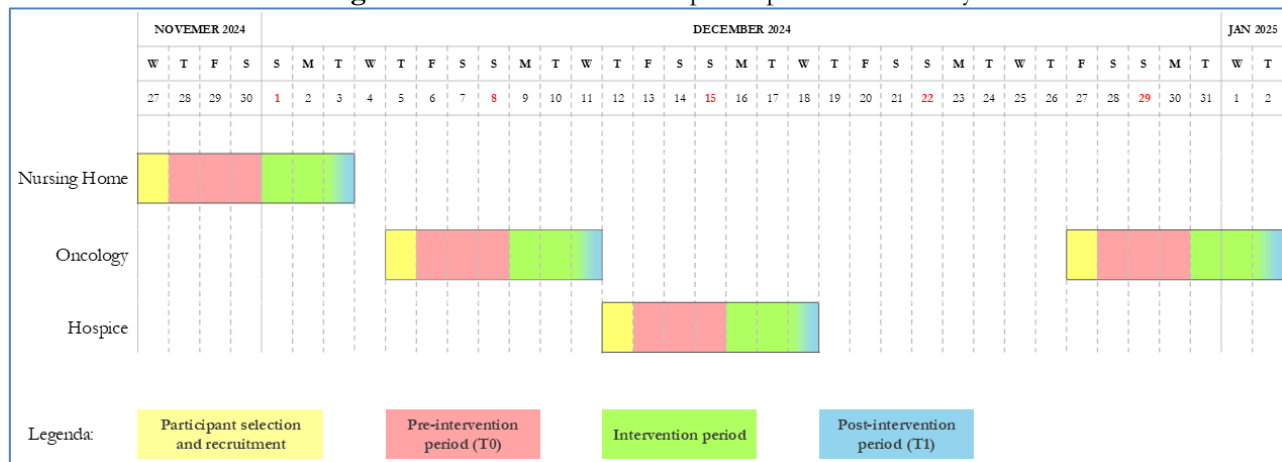
- RSA: List from RES-001 to RES-013 (13 subjects)
- Oncology: 2 Lists:
 - MED-014 to MED-023 (10 subjects)
 - MED-031 to MED-035 (5 subjects)
- Hospice: List from HOS-024 to HOS-030 (7 subjects)

To prevent any influence on data collection, a masking system was implemented using opaque envelopes labeled with the patients' alphanumeric code followed by a final letter: "A" denoted T0 (e.g., RES-005-A), while "B" denoted T1. However, given the type of intervention, complete blinding could not be achieved.





Figure 4. Gantt chart of the empirical phase of the study



Sample

Data relating to the sample are shown in *Table 2*.

Table 2. Sample characteristics

Sociodemographic characteristic		TOT	Nursing Home	Oncology	Hospice
Sample size:		34 (100%)	13 (38%)	14 (41%)	7 (21%)
Gender:	Female (%)	23 (68%)	10	8	5
	Range	45-96	77-96	45-83	59-87
Age:	(Mean)	(77)	(86)	(71)	(73)
Educational level:	None	1 (3%)	-	-	1
	Primary school	12 (35%)	7	3	2
	Middle school	10 (29%)	2	5	3
	High school	11 (32%)	4	6	1
	University	-	-	-	-
Region of origin	Northern Italy	22 (65%)	9	9	4
	Central Italy	-	-	-	-
	Southern Italy and Islands	9 (26%)	4	3	2
	Out of Italy	3 (9%)	-	2	1
Length of hospital stay (at T0)	3-5 days	1 (3%)	-	1	-
	6-8 days	3 (9%)	-	2	1
	9-11 days	2 (6%)	-	1	1
	12-14 days	5 (15%)	1	4	-
	>15 days	23 (67%)	12	6	5





Questionnaire results

Comparison of the questionnaire responses between T0 and T1 (*Table 3*) shows a narrowing and a shift in the distribution toward the more positive values of the Likert scale, favoring T1. This variation is evident across all items

related to mood, palatability, and satisfaction, accompanied by an increase in the mean values. By contrast, the outcome concerning interaction with staff shows a smaller difference in the distribution range and mean values, favoring T1.

Table 3. Descriptive statistics for questionnaire items, including range, mean, median, standard deviation (SD), and standard error (SE), during the pre-intervention (T0) and intervention (T1) periods.

Outcomes	Items	Range		Mean		Median		SD		SE	
(N=34)		T0	T1	T0	T1	T0	T1	T0	T1	T0	T1
Satisfaction	Item 1	2-5	3-5	3.7	4.3	4	4	0.94	0.79	0.161	0.136
	Item 2	1-5	3-5	3.3	4.6	3	5	1.09	0.7	0.187	0.12
	Item 3	2-5	2-5	3.8	4.4	4	5	1.05	0.78	0.179	0.134
	Item 4	2-5	3-5	3.9	4.6	4	5	0.98	0.71	0.169	0.121
Mood tone	Item 5	1-5	2-5	3.4	4.2	4	4	1.21	0.88	0.207	0.151
	Item 6	2-5	3-5	3.3	4.1	3	4	0.83	0.6	0.142	0.103
	Item 7	2-5	3-5	3.4	4.5	3	4.5	0.78	0.56	0.134	0.097
Palatability	Item 8	1-5	2-5	3.7	3.8	4	4	1	0.77	0.172	0.132
	Item 9	1-5	2-5	3.3	4.2	3.5	4	1.17	0.73	0.201	0.125
	Item 10	1-5	2-5	3.2	3.8	3	4	1.42	1.02	0.244	0.174
Interactions with healthcare professionals	Item 11	2-5	3-5	4.5	4.6	5	5	0.83	0.61	0.142	0.105
	Item 12	2-5	2-5	4.2	4.2	5	4	1.1	0.94	0.189	0.161
	Item 13	1-5	1-5	4	4.1	4	4	1.03	0.87	0.177	0.149
	Item 14	1-5	1-5	4	4	4	4	1.05	1	0.182	0.174



Wilcoxon Rank-Sum Test

To evaluate differences in the measurements between the pre-intervention period (T0) and the intervention period (T1), the Wilcoxon rank-sum test (W) was conducted using Jamovi software, version 2.6.19. In view of the limitations of the study, a correction for multiple comparisons was subsequently applied. Holm's correction (R software, v. 4.6.0) was selected as a less conservative approach for a quasi-experimental study, and it was applied separately within each domain, consistently with the construction and validation of the questionnaire.

The results of the test, reported in *Table 4*, overall indicate a possible influence of the intervention on the outcomes of satisfaction, mood and palatability. In particular, all items within the acceptance outcome (W: 136–338) and the mood outcome (W: 209.5–351.0) showed statistically significant differences between T0 and T1 (satisfaction p : <0.001–0.013; mood p : <0.001–0.003). For the palatability outcome, one of the three items showed statistically significant differences (W: 204; p : <0.001), whereas one item (W: 193) was borderline (p : 0.058) and the third item (W: 85) did not reach statistical significance (p : 0.685).

With regard to interaction with health care professionals, although a slight improvement in ratings was observed during the intervention period (W: 42–83), none of the items showed statistically significant differences (p : 1).

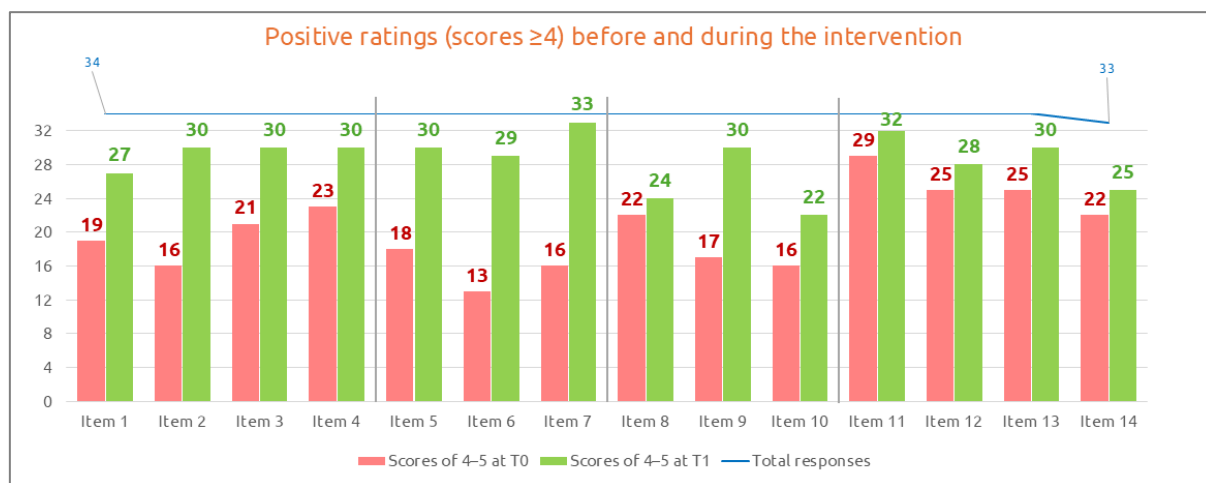
McNemar's Test

The frequencies of the highest values on the Likert scale (4 and 5) were compared across the two periods (T0 and T1) and presented in Graph 1.

Tabella 4. Wilcoxon Test's results (W) and Holm correction

Outcomes	Items	W	p value	Holm
Satisfaction	Item 1	205	0.009	0.013
	Item 2	338	<0.001	<0.001
	Item 3	136	0.004	0.013
	Item 4	164	0.005	0.013
Mood tone	Item 5	210	0.003	0.003
	Item 6	238	<0.001	<0.001
	Item 7	351	<0.001	<0.001
Palatability	Item 8	85	0.685	0.685
	Item 9	204	<0.001	<0.001
	Item 10	193	0.029	0.058
Interactions with healthcare professionals	Item 11	79	0.562	1
	Item 12	42	0.822	1
	Item 13	83	0.415	1
	Item 14	72.5	0.828	1

The graph indicates that all questionnaire items showed an increase in positive ratings (≥ 4 on the Likert scale) at T1 compared with baseline (T0), particularly those related to mood. The frequency data of the positive ratings (4 and 5) and the negative ratings (1 to 3) of the Likert scale were analysed using McNemar's test. To perform the test, 2x2 tables were prepared for each item, including the discordant values across the two periods between positive and negative ratings.



Graph 1. Comparison of the frequencies of positive ratings (Likert scale scores of 4 and 5) between the pre-intervention (T0) and intervention (T1) periods across the entire study sample.

McNemar's test results (χ^2) were subsequently adjusted using Holm's procedure (R v.4.6.0). The most marked increases in positive ratings (scores 4 and 5 of the Likert scale) were observed in the satisfaction and mood outcomes, although significance was reduced after correction for items 1 and 4. Mood retained statistical significance across all three items. After correction, the palatability outcome showed greater heterogeneity in the results, with only 1 of the 3 items retaining statistical significance. The absence of statistical significance was confirmed for the outcome concerning interaction with health care professionals.

The overall concordance between the results obtained from the two statistical tests supports a possible positive effect of the intervention on most of the outcomes examined, although within the context of an exploratory study.

Table 5. McNemar's test (χ^2) results and Holm correction

Outcomes	Items	χ^2	p value	GdL	Holm
Satisfaction	Item 1	4	0.046	1	0.077
	Item 2	10.9	<0.001	1	0.001
	Item 3	7.36	0.007	1	0.012
	Item 4	4.45	0.035	1	0.065
Mood Tone	Item 5	9	0.003	1	0.004
	Item 6	12.8	<0.001	1	<0.001
	Item 7	17	<0.001	1	<0.001
Palatability	Item 8	0.33	0.564	1	0.774
	Item 9	13	<0.001	1	<0.001
	Item 10	2.25	0.134	1	0.21
Interactions with healthcare professionals	Item 11	1.29	0.257	1	0.453
	Item 12	1.8	0.18	1	0.373
	Item 13	5	0.025	1	0.062
	Item 14	0.69	0.405	1	0.774

Descriptive analysis of the study settings

As no comparative statistical analyses were conducted on the subpopulations within the respective settings, differences in the number and percentage of improved item ratings by category were analysed between T0 and T1 (Tables 6a, 6b, 6c).

The tables show an overall increase in positive ratings for the variables of satisfaction, mood, and palatability across all three settings. The only inverse trend was observed for the variable of interaction with health care professionals in the Oncology setting, with a 5% decrease in the positivity rate at T1 compared with T0.

The setting showing the greatest improvement is Hospice, with positivity rates exceeding 90% across all four variables, particularly for the outcomes of mood and palatability. In the RSA setting, increases ranged from +16% for interaction with health care professionals to +43% for mood.

Across all three contexts, mood is the variable showing the greatest shift in favor of the intervention, with increases ranging from +43% to +47%. The satisfaction variable shows increases ranging from +26% to +32%, the palatability variable from +3% to +52%, while the range of change for the outcome of interaction with health care professionals spans from -5% to +28%.



Figure 5a. Implementation of the intervention in the nursing home setting



Figure 5b Implementation of the intervention in the oncology setting



Figure 5c. Implementation of the intervention in the hospice setting

Table 6a: Comparison of response ranges and the number and percentage of positive ratings (Likert scale scores of 4 and 5), by item and outcome, in the nursing home subsample.

Nursing Home (N=13)		1	2	3	4	5	6	7	8	9	10	11	12	13	14
		SATISFACTION				MOOD TONE			PALATABILITY			INTERACTIONS WITH HEALTHCARE PROF.			
T0	Range	02-05	02-05	02-05	02-05	02-05	02-05	02-05	02-05	02-05	01-05	02-05	02-05	01-05	01-05
	Positive Rating (4-5)	8	5	10	7	7	5	7	8	7	7	10	9	8	7
		62%	39%	77%	54%	54%	39%	54%	62%	54%	54%	77%	69%	62%	54%
		58%				49%			56%			65%			
T1	Range	03-05	03-05	04-05	03-05	02-05	03-05	04-05	02-05	03-05	02-05	03-05	02-05	02-05	02-05
	Positive Rating (4-5)	9	11	13	11	12	11	13	9	12	10	11	10	12	9
		69%	85%	100%	85%	92%	85%	100%	69%	92%	77%	85%	77%	92%	69%
		85%				92%			79%			81%			
% Improvement			46%	23%	31%	38%	46%	46%	7%	38%	23%	8%	8%	30%	15%
		27%				43%			23%			16%			





Table 6b: Comparison of response ranges and the number and percentage of positive ratings (Likert scale scores of 4 and 5), by item and outcome, in the oncology subsample. Item 14 at T0 includes 13 ratings instead of 14 *.

Oncology (N=14)		1	2	3	4	5	6	7	8	9	10	11	12	13	14
		SATISFACTION				MOOD TONE			PALATABILITY			INTERACTIONS WITH HEALTHCARE PROF.			
T0	Range	02-05	01-05	02-05	02-05	01-05	02-04	02-04	02-05	01-05	01-05	04-05	02-05	02-05	02-05
	Positive Rating (4-5)	8	7	5	10	8	4	6	10	7	7	14	12	11	11
		57%	50%	36%	71%	57%	29%	43%	71%	50%	50%	100%	86%	79%	*85%
		54%				43%			57%			87%			
T1	Range	03-05	03-05	02-05	03-05	02-05	03-05	03-05	03-05	02-05	02-05	04-05	02-05	03-05	01-05
	Positive Rating (4-5)	11	12	10	12	11	12	13	8	11	6	14	11	12	9
		79%	86%	71%	86%	79%	86%	93%	57%	79%	43%	100%	76%	86%	64%
		80%				86%			59%			82%			
% Improvement		21%	50%	36%	14%	21%	57%	50%	-14%	29%	-7%	-	-7%	7%	-20%
		26%				43%			2%			*-5%			

Table 6c: Comparison of response ranges and the number and percentage of positive ratings (Likert scale scores of 4 and 5), by item and outcome, in the hospice subsample.

Hospice (N=7)		1	2	3	4	5	6	7	8	9	10	11	12	13	14
		SATISFACTION				MOOD TONE			PALATABILITY			INTERACTIONS WITH HEALTHCARE PROF.			
T0	Range	03-05	01-05	03-05	02-05	01-05	03-05	02-05	01-05	02-05	01-05	03-05	03-05	03-05	03-05
	Positive Rating (4-5)	3	4	6	6	3	4	3	4	3	2	5	4	6	4
		43%	57%	86%	86%	43%	57%	43%	57%	43%	29%	71%	57%	86%	57%
		68%				48%			43%			68%			
T1	Range	04-05	04-05	04-05	04-05	04-05	03-05	04-05	04-05	04-05	03-05	04-05	04-05	01-05	04-05
	Positive Rating (4-5)	7	7	7	7	7	6	7	7	7	6	7	7	6	7
		100%	100%	100%	100%	100%	86%	100%	100%	100%	86%	100%	100%	86%	100%
		100%				95%			95%			96%			
% Improvement			43%	14%	14%	57%	29%	57%	43%	57%	86%	29%	43%	-	43%
		32%				47%			52%			28%			





FFED recording and caloric intake calculation

The FFED forms were administered to patients for self-completion, with the support of health care support staff (OSS), who were responsible for breakfast distribution, for those patients requiring assistance with completion.

To estimate calorie intake and the relative difference between T0 and T1, the kilo-calorie value (Kcal) of the foods eaten by each participant across the different settings was considered (*Table 7*) and recalculated using a

weighting equivalent to the amount (in %) of food consumed by each participant, as recorded through the FFED:

- 100% = weighting 1
- 75% = weighting 0.75
- 50% = weighting 0.5
- 25% = weighting 0.25
- <25% = weighting 0.1

Table 7. Energy content of breakfast foods provided in the three healthcare settings.

Breakfast foods	NH San Giacomo		Oncology San Luigi		Hospice Valletta	
	Serving size (g/mL)	Energy (kcal)	Serving size (g/mL)	Energy (kcal)	Serving size (g/mL)	Energy (kcal)
Barley milk coffee		234 Kcal		183,57 Kcal		253 Kcal
Barley coffee	Mug 400 ml	80 Kcal	Tazza da 300 ml		Tazza da 400 ml	
Sweetened tea		28 Kcal		30 Kcal		32 Kcal
Savoirdo biscuit (unwrapped)	10 g	37,8 Kcal	-	-	-	-
Shortbread biscuit	8 g	36,8 Kcal	Pacco 25g	115,25Kcal	Pacco 25g	115,25Kcal
Rusks	7,5 g	30,4 Kcal	Pacco 15 g	61,35 Kcal	Pacco 15 g	61,35 Kcal
Plumcake	33 g	130 Kcal	-	-	-	-
Vanilla pudding	-	-	80 g	75,2 Kcal	-	-
Chocolate pudding	-	-		82,4 Kcal	-	-
Fruit yogurt	-	-	125 g	127,5 Kcal	-	-
Fruit purée	-	-	100 g	63 Kcal	-	-
Jam	25 g	37,25 Kcal	25 g	37,25 Kcal	25 g	37,25 Kcal
Breadsticks	-	-	12 g	49,32 Kcal	-	-
Fruit juice	-	-	200 ml	112 Kcal	-	-

The Kcal intake values and the mean FFED values across the two periods are presented in *Table 8*.





Tabella 8. Mean FFED score and mean caloric intake during the pre-intervention (T0) and intervention (T1) periods.

Setting	Participant	T0		T1		T1/T0
		Kcal	Mean FFED	Kcal	FEED medio	Ratio
NH San Giacomo	RES-001	1190,45	1	1066,80	1	0,89 (↓)
	RES-002	597,70	0.94	625,35	1	1,05 ()
	RES-003	1026,55	1	1087,35	1	1,06 ()
	RES-004	560,55	1	560,55	1	1 (=)
	RES-005	780,75	0.83	629,10	0.63	0,80 (↓)
	RES-006	1935,35	1	1548,40	1	0,80 (↓)
	RES-007	1160,50	1	1155,60	1	0,99 (↓)
	RES-008	1456,50	1	975,60	1	0,66 (↓)
	RES-009	1658,80	1	1806	1	1,09 ()
	RES-010	1272,50	1	1066,80	1	0,84 (↓)
	RES-011	1042,20	1	1042,20	1	1 (=)
	RES-012	1158	1	1127,60	1	0,97 (↓)
	RES-013	1443,75	1	1374,10	1	0,95 (↓)
SCDU Oncology Medicine AOU San Luigi Gonzaga	MED-014	577,37	1	474,25	1	0,82 (↓)
	MED-015	1124,21	0.92	1260,20	1	1,12 ()
	MED-016	660,85	0.96	358,05	1	0,54 (↓)
	MED-017	1713,25	1	659,35	0.67	0,38 (↓)
	MED-018	433,23	0.83	697,46	0.79	1.60 ()
	MED-019	841,49	0.97	775,35	1	0,92 (↓)
	MED-020	1332,15	1	764,53	0.63	0,57 (↓)
	MED-021	1846,44	1	1263,92	0.67	0,68 (↓)
	MED-022	625,88	0.97	836,39	1	1,34 ()
	MED-023	1146,35	1	687,40	0.67	0,60 (↓)
	MED-031	772,25	0.83	1354,50	1	1,75 ()
	MED-032	1171,75	1	796,70	1	0,68 (↓)
	MED-033	1279,40	1	884,60	0.67	0,69 (↓)
	MED-034	911,50	0.89	458,10	1	0,50 (↓)
Hospice Valletta	HOS-024	725,25	0.75	1565,75	1	2,16 ()
	HOS-025	787,50	1	1085,25	1	1,38 ()
	HOS-026	1363,30	1	1457,95	1	1,07 ()
	HOS-027	1121,70	1	1230,95	0.93	1,1 ()
	HOS-028	2008,35	1	1746,30	1	0,87 (↓)
	HOS-029	1467,45	1	1681	1	1,15 ()
	HOS-030	2092,20	1	2049,25	1	0,98 (↓)
Legend:						
Presence of symptoms affecting food intake Fasting for diagnostic procedures (1 day)						





DISSERTATION NURSING®

JOURNAL HOMEPAGE: [HTTPS://RIVISTE.UNIMI.IT/INDEX.PHP/DISSERTATIONNURSING](https://riviste.unimi.it/index.php/dissertationnursing)



During the intervention period, in the Oncology setting, fasting for diagnostic purposes was prescribed for 5 participants (2 in the first period and 3 in the second sampling period). In addition, two participants experienced bothersome symptoms that impaired intake. When comparing the caloric intake values for each participant between the two periods (T1/T0) 20 of the 34 participants showed a decrease in caloric intake, 2 participants reported the same caloric intake in both periods, and the remaining 12 participants showed an increase in caloric intake. Mean Kcal intake across the two periods was compared using the Wilcoxon rank test (Table 9).

Tabella 9. Results of the Wilcoxon test comparing caloric intake (kcal) between T0 and T1 periods.

	Mean	W	p value	Rank-biserial correlation
T0	1155 Kcal	182	0.08	-0.351
T1	1036 Kcal			

The test showed a substantial difference (W. 182) between the two periods, favouring T0 (biserial correlation: -0.351). However, the test result was not statistically significant (p: 0.080), therefore no Holm correction was applied.

This result could be related to different factors such as the different choice of foods required on the days of observation, different beverage portioning due to the operator present, level of satiety and calories consumed at dinner on the previous evening, among others. Fasting episodes, which occurred exclusively during T1, may also have influenced the results by contributing to a greater number of low T1/T0 values. Moreover, the FFED requires an operator-dependent approximate estimate,

which entails a minimal degree of imprecision. It cannot be excluded that oversampling during the holiday period (between Christmas and New Year) also affected participants' food intake.

Semi-structured interviews

Interviews were conducted on a randomized sub-sample of the study population.

For each setting, participants were randomized using the Randomizer software. Randomized subjects were asked for consent and written permission to be interviewed and recorded and only those who signed consent were enrolled (Table 10).

Tabella 10. Sociodemographic characteristics of the randomized subsample selected for the semi-structured interviews.

Sociodemographic characteristic	NH	Oncology	Hospice	TOTAL
Randomized participants	5	9	4	18
Interviewed participants:	3 (30%)	5 (50%)	2 (20%)	10 (100%)
Gender (f)	2	3	1	6 (60%)
Age:				
Range	84-90	45-77	59-85	45-90
Mean	87,6	67,2	72	73,3
Education:				
Primary school	1	-	2	3 (30%)
High school	2	5	-	7 (70%)
Region of origin:				
Northern Italy	3	5	2	10 (100%)

The interviews, which were audio-recorded and transcribed using Speechnotes, were conducted until thematic saturation was reached. Qualitative thematic analysis was managed with QualCoder software, which enabled the development of a categorical coding framework (Table 11).

Table 11. Categorical coding framework for participants' responses and the number (N) of participants assigned to each category.

Question	Categories	N	Verbatim
What is your opinion of the aesthetic appearance of food served in care settings? [Without considering the intervention]	1A. You eat with your eyes first	2	"It's important because, as the saying goes, you eat with your eyes first. It's nice to see something that lifts your spirits" "To me, food has always been something cheerful"
	1B. Better not to look	4	"Hospital food isn't very appealing" "Pretty negative" "It looks a bit neglected" "The presentation leaves a lot to be desired, just served on the plate like that..."
	1C. It passed the test	4	"Yes, I'd rate it very highly because you can tell a lot of care has gone into it"

Corresponding author: Stefano Testa
testastefano@hotmail.com, C/O Corso di Laurea in Infermieristica, Università degli Studi di Torino – AOU San Luigi Gonzaga Regione Gonzole 10 10043, Orbassano (TO) ITALY



Milano University Press

280

Submission received: 08/09/2025
End of Peer Review process: 05/07/2026
Accepted: 27/07/2026



DISSERTATION NURSING®

JOURNAL HOMEPAGE: [HTTPS://RIVISTE.UNIMI.IT/INDEX.PHP/DISSERTATIONNURSING](https://riviste.unimi.it/index.php/dissertationnursing)



			<i>"Usually we're just given a paper napkin with the cup[...] I'd say that's about enough in terms of presentation"</i> <i>"It's fine as it is"</i> <i>"Well, it wasn't restaurant-quality, but it was respectable"</i>
What emotions does it elicit?	1D. What about emotions?	5	<i>"I couldn't really say..."</i> <i>"Well, I wouldn't call them emotions... I'd call it nourishment"</i> <i>"I don't know... I'm a bit reserved, so I'm not really sure what to say"</i> <i>"None" (2)</i>
	1E. I have a bad feeling	3	<i>"It kind of puts you off your food... it takes away your appetite"</i> <i>"I'm a bit fussy, so it does bother me"</i> <i>"Let's just say the food wasn't great... but you ate it anyway"</i>
	1F. Beauty lifts your spirits	2	<i>"I'd say it depends on the situation. It might make you feel happy... or it might not. But overall, I'd say it was a positive experience"</i> <i>"It gives me the feeling that there are people around me who really care"</i>
What other aspects should be improved?	1G. Better quality	3	<i>"The quality could be improved too"</i> <i>"The quality of the food"</i> <i>"The quality of the food, definitely."</i>
	1H. More variety	1	<i>"Having more choice and a wider variety of dishes"</i>
	1I. More attention to detail	2	<i>"Menus could be more detailed, so you know exactly what's in the food"</i> <i>"I'd say it doesn't have to be anything elaborate [...] simple touches like the ones you introduced are enough."</i>
	1L. Is there really anything else to improve?	4	<i>"Something to improve?... No, honestly, I think everything is lovely, really everything"</i> <i>"I don't know... I'm happy with it. I like it just the way it is"</i> <i>"Even though this isn't the most important thing [...] I'm very happy here"</i> <i>"I can't say I've ever had any problems with hospital meals"</i>
How has your perception of food served in the health care setting changed after the intervention?	2A. Noticing the difference	6	<i>"I really liked it... the flowers, the little decorations... they made everything much nicer to look at"</i> <i>"I really appreciated coming down in the morning and seeing the flowers, the origami... all those little touches that make you want to start the day on a positive note."</i> <i>"At the end of the day, coffee with milk is still coffee with milk... but I have to say, the placemat, the flower, the presentation... even the message on the placemat... it really cheers you up"</i> <i>"I think we should all do certain things... it's hard to explain why... but it can really make a difference to someone. It made me realize how much even small changes can matter"</i> <i>"There's a happier atmosphere, and that's definitely better. It doesn't feel so much like being shut inside. It certainly makes the whole environment feel nicer"</i> <i>"You almost forget you're in a hospital. It feels more like walking into a restaurant, getting out of bed and sitting down to have breakfast"</i>
	2B. Confirmation and reassurance	4	<i>"My opinion stayed the same because I already thought the food was good. Of course, there's always room for improvement, but overall it was already fine"</i>

Corresponding author: Stefano Testa
testastefano@hotmail.com, C/O Corso di Laurea in
 Infermieristica, Università degli Studi di Torino –
 AOU San Luigi Gonzaga Regione Gonzole 10
 10043, Orbassano (TO) ITALY



Milano University Press

281

Submission received: 08/09/2025
 End of Peer Review process: 05/07/2026
 Accepted: 27/07/2026





			<i>"When you're unwell, you can't really eat. You don't pay much attention to how the food looks because you're feeling ill. Then, once you get hungry, appearance still takes a back seat"</i> <i>"As far as I'm concerned, everything was fine, just as it always is."</i> <i>"Well, it confirmed what I already thought. Everything was nicely prepared and there was some variety too... you could tell some thought had gone into it"</i>
	2C. A sense of escape	2	<i>"It gave me something different to think about. Seeing the way everything was presented [...] those beautiful flowers... brought back memories of my hometown. There was a river there, with beautiful flowers growing along it. Looking at them took me back to those walks I used to take"</i> <i>"It takes you away from all this..."</i>
What emotions did the intervention evoke?	3A. Joy and cheerfulness	7	<i>"A happy feeling..."</i> <i>"You enjoy your breakfast much more... I mean, I wake up in the morning actually looking forward to breakfast, and that never used to happen before"</i> <i>...somehow it gave me strength, joy, and a sense of cheerfulness."</i> <i>"...everyone enjoyed it. We were all really pleased"</i> <i>"I'm happy. Even the person in the next bed was happy too"</i> <i>"It was nice... a little playful touch"</i> <i>"I liked it, and then I thought, 'Oh, look... you could even use it as a cup holder or a fruit holder afterwards"</i>
	3B. Surprise	3	<i>"The last thing I expected was for food to make a difference, but this lovely presentation really helped"</i> <i>"I have to say, I was pleasantly surprised that, at last, nursing homes and hospitals were paying attention to the appearance of the food as well"</i> <i>"I really wasn't expecting it. I just thought, 'Well, I'm in hospital, I'm having breakfast...' but it turned out to be such a pleasant surprise."</i>
What information should nurses/health care professionals gather in order to understand a patient's dietary expectations and needs?	4A. We can't expect any more from them	2	<i>"Healthcare is already under a lot of pressure... asking staff to take on even more and pay attention to every little preference patients may have seems a bit too much right now"</i> <i>"That's a difficult question [...] and it's certainly not the nurse's fault. They already have so many other responsibilities to deal with"</i>
	4B. I couldn't ask for more	6	<i>"But I think the nurses are already doing that anyway"</i> <i>"Well, I think they're doing a great job"</i> <i>"I'd say the service is already very well organised and the staff are incredibly dedicated"</i> <i>"No, there's nothing else I'd ask for."</i> <i>"I feel well looked after"</i> <i>"Well, I think they already treat us very well"</i>
	4C. Just a little more	2	<i>"Trying to get to know each person individually"</i> <i>"Maybe paying a little more attention to the food combinations"</i>





Analysis of the responses indicates that, among the 10 participants, 4 held a negative opinion of the hospital food service before the intervention, 2 held a neutral opinion, and 4 expressed a positive opinion. After the intervention, an overall improvement in opinion was observed: 4 participants shifted their opinion in a positive direction compared with the previous assessment, 5 participants maintained a positive opinion, and only 1 participant stated that *"When you are ill ... aesthetics takes a back seat"*. For 2 participants, the experience evoked thoughts of escape and memories of the past.

With regard to emotions experienced, before the intervention only 2 participants reported positive emotions in relation to mealtime in the health care setting, whereas the remaining participants reported either negative emotions (3 participants) or no emotions at all (5 participants). Following the intervention, all interviewed participants reported positive emotions during the intervention. Finally, it is noteworthy that 4 out of 10 participants believed that no further involvement could be expected from health care professionals, especially nursing staff, who were perceived as already overburdened by other duties. For 4 participants, by contrast, staff were already doing everything necessary to improve patients' mealtime experience.

DISCUSSION

Food intake in the health care setting is a multi factorial phenomenon influenced by several factors, including the patient's clinical condition, food quality, the organization of the food service, environmental and aesthetic factors, and interactions with other users and health care professionals (3,10,19).

Some authors have noted that meal presentation is an aspect considered and assessed by patients, (2,10–13) suggesting that it may be an element capable of stimulating appetite and improving the patient's mealtime experience (2,3,10,17).

However, the hedonistic aspect of food has received limited attention in the literature, in fact, only two clinical trials (17,18) have investigated the effects of improving meal aesthetics and presentation in hospital settings. Other authors have examined environmental factors and how they may influence food intake(14), or how the shape and colour of plates can affect the perception of the quality of the hospital food service(15). The outcomes reported by these authors were limited to satisfaction and increasing food intake.

To date, certain dimensions of the mealtime experience in health care settings have not been explored in the

literature, including effects on mood and emotional state. Neuroscience has shown how visual stimuli activate reward circuits in the brain, producing homeostatic and non-homeostatic mechanisms capable of modifying eating behaviour, further stimulating appetite even when the body's energy requirements have been met(4,5). On the basis of these mechanisms, some marketing studies have examined changes in emotional state (6,9) and in users' eating behaviour (7–9) in relation to the aesthetic component of food.. Although these studies were designed for commercial rather than clinical-care purposes, their findings suggest that aesthetic interventions may also influence patients' mealtime experience, with potentially therapeutic effects.

Given the multidimensional nature of the phenomenon and the limited literature available to address the research question, a quasi-experimental exploratory pilot study was selected, extending observation to multiple outcomes, including mood and emotional state, which have not been studied in health care settings, alongside other outcomes already described in the literature (satisfaction, food intake, and interaction with health care professionals).

Satisfaction & Expectations.

From the studies identified in the literature, overall satisfaction with food in health care settings appears to be moderately good. However, meal presentation often emerges as one of the most criticized aspects and is associated with lower satisfaction scores. (23).

In studies where corrective actions were implemented to improve the food service provision, patients' satisfaction was higher than their initially reported expectations.(10,11,17).

The findings of the present study regarding satisfaction with the intervention are consistent with the evidence reported in the literature. The Wilcoxon signed-rank test suggests that an aesthetic intervention on meal presentation can positively influence patients' satisfaction with the mealtime experience ($W = 136-338$). This influence was also partially detected by McNemar's test ($X^2 = 4 - 10.9$; $p = 0.001 - 0.077$). The outcome "Satisfaction" showed a higher frequency of positive ratings (scores 4 and 5 on the Likert scale) in all three study settings—nursing home (RSA, +27%), oncology ward (+26%), and hospice (+32%)—during the intervention period compared with the previous period characterised by standard presentation.

Qualitative analysis has enriched the interpretation of quantitative results. During the interviews, all patients ($n=10$) reported that they liked the intervention. For most





of the sample interviewed (n=8) the intervention confirmed and strengthened the already good level of satisfaction while 2 participants shifted their satisfaction from negative to positive.

With regard to patients' expectations about food in health care settings, the literature generally reports a negative trend. (10,13,18,23). However, the qualitative data analysis conducted in this thesis project revealed a deviation from what has been described in previous studies. Most of the interviewed sample (6/10) expressed positive expectations and opinions about the food already in the pre-intervention observation period. Notably, the number of patients with positive expectations was lower in the oncology setting (1 out of 5) than in the hospice (1 out of 2) and nursing home (2 out of 3) settings. This discrepancy from the literature may be explained by the specific characteristics of the settings involved and by the perceived quality of the food services included in the study. These observations suggest that patients' expectations may be influenced not only by the intrinsic characteristics of the food, but also by the care context and by previous experiences accumulated along the care pathway.

Mood and emotions.

Given the lack of available literature focusing on this specific dimension, mood was included among the study outcomes, within an integrated quantitative–qualitative framework.

Quantitative results suggest that there is a positive influence of aesthetic intervention on mood tone. The Wilcoxon signed-rank test revealed statistically significant differences ($W=209-351$; $p: <0.001-0.003$) in favour of the intervention. A similar result in favour of the intervention was also observed through the McNemar test ($X^2= 9-17$; $p: <0.001-0.004$). Considering the data across all three settings, mood was among the outcomes showing the greatest increase in positive evaluations, with a rise of +43% in the nursing home and oncology ward and +47% in the hospice during the intervention period.

The qualitative data from the interviews integrate the quantitative results reported above, providing insight into the emotions that patients experienced throughout the study and how these were modified in response to the intervention.

The qualitative analysis shows a transformation of the emotions associated with the time of breakfast: before the intervention only two participants reported having experienced positive emotions, while the majority of participants reported an absence of emotions (5 out of 10) or negative emotions (3 out of 10). In the post-

intervention phase (T1), the entire interviewed sample (n = 10) reported positive emotional experiences. The majority described emotions of joy and cheerfulness (7/10), whereas 3 participants out of 10 reported feelings of surprise, noting that the intervention provided an experience that was diametrically different from those reported at baseline (T0).

The authors Wu, Liang, Zhang et al. (6) observed that foods with a high aesthetic value are more comforting and sought after by subjects with a negative emotional state. This aspect emerged most clearly in the oncology setting, in which pre-intervention expectations and emotional experiences were less frequently positive than in the other care settings. After the intervention, the oncology setting exhibited a stronger influence on patients' mood and on the thoughts they associated with the mealtime experience.

A factor to be considered for a more realistic reading of the observed phenomenon is the Hawthorn effect. It is plausible that some of the positive emotions reported by participants were shaped by the heightened attention associated with the intervention and by a perceived improvement in the care provided to them, independently of the specific aesthetic modifications.

Nevertheless, the findings observed in this project are consistent with evidence emerging from other research fields and therefore warrant further, context-specific investigation in clinical care settings.

Palatability and intake.

Appetite is one of the main aspects to consider when assessing nutritional status. Loss of appetite in health care and long-term care settings is a common phenomenon, especially in older populations and in patients receiving texture-modified diets(3,19,20,35), and it is recognised as a major risk factor for malnutrition(19).

For many patients, the degree of appetite is perceived as a sign of recovery (10). Illness and medical treatments are among the main causes of appetite loss.(12).

The statistical analysis performed in this study suggests that improving the aesthetic presentation of meals may positively influence patients' desire to eat. The second and third items of the variable show consistent W-values (item 9= 204; item 10= 193) but only item 9 retains statistical significance. Furthermore, looking at the data relating to the first item [*Does the appearance of breakfast (colour and texture of the food) make you want to eat?*], the intervention did not appear to have a statistically significant effect ($W=85$; $p=0.685$) on the intrinsic palatability of the food. This borderline influence is found in McNemar's test results





($X^2 = 0.333-13.0$; $p = <0.001-0.774$). The qualitative analysis was consistent with these findings: one of the interviewed patients stated, “*As for the food, nothing has changed, because coffee with milk is still coffee with milk.*” These results suggest that a more careful presentation could have a stimulating effect on appetite but is not sufficient to fully improve the palatability of the food offered. However, although specific studies on aesthetic effects are still lacking, the literature indicates that careful meal presentation (11–13,17,19) and attention to the mealtime environment (13,14,16) are potential strategies to improve food intake and thereby help prevent malnutrition.

One possible explanation is that the palatability of food does not always translate into greater intake, since aesthetics is only one of the factors that contribute to food intake(4). Although visual stimuli contribute to triggering reward circuits by increasing the desire to eat(4,6), taste perception and homeostatic mechanisms determine the reinforcement of the stimulus or its inhibition(4).

With regard to caloric intake, the results of this study show a trend that is opposite to what has been reported in the literature. The Wilcoxon signed-rank test applied to caloric intake data indicated a decrease in energy intake in relation to the intervention. No increase in caloric intake was observed in the sample following the intervention (Wilcoxon signed-rank test: $W = 182$; matched-pairs rank-biserial correlation = -0.351). However, this reduction is not statistically significant ($p = 0.08$). The trend in caloric intake appears to be in contrast with the tendencies detected for the outcomes of satisfaction, mood, and palatability. One possible explanation lies in the multidimensional nature of the phenomenon, whereby the desire to eat and actual food intake may be influenced by different factors, and to different degrees, within the care setting. Despite the positive effect of the intervention on patients’ desire to eat and their subjective experience of the meal, these dimensions do not appear to be directly or immediately reflected in higher caloric intake. As observed by the authors Beck, Martinsen, Poulsen and Birkelund (16), in hospital settings, various environmental barriers may hinder food intake, including unpleasant smells and meal interruptions due to clinical procedures carried out by health care professionals. The aesthetic experience of the meal may help to improve patients’ perception of the eating experience and stimulate their desire to eat, but caloric intake is a complex outcome, also influenced by numerous biological, clinical, psychological and organisational factors that may act simultaneously and with varying intensity.

In addition, some confounding factors may have contributed to the observed result. In particular, prescribed fasting periods for diagnostic procedures, occurring only during the intervention phase, and the fact that part of the data collection overlapped with the Christmas holiday period as a consequence of oversampling in the oncology setting may have influenced the caloric intake recorded. In addition, physiological variability in patients’ food choices and operational variability among staff involved in meal distribution are likely to have further affected the measured energy intake.

Taken together, these observations mean that the present findings are insufficient to support hypotheses regarding the impact of the intervention on caloric intake. Instead, they point to the need for further research using study designs that explicitly account for and control key confounding factors affecting nutrition in health care environments.

Interaction with Health care Professionals

Patient interaction with staff at mealtimes emerged as one of the most positively evaluated aspects of the meal experience(10,23). Enhancing the quality of the food service impacts favourably both patients and health care staff, with the latter reporting gains in motivation and in satisfaction with the care they provide.(18). When nurses actively intervene to optimise the environment during meals, the patients’ mealtime experience is enhanced and, consequently, their judgment of nursing care tends to be more positive.(16). A valid example in the literature is the “Quiet please” approach implemented by nurses, in which nursing activities are minimized during meals, producing positive effects on satisfaction, appetite and social interaction(14).

In the quantitative questionnaire analysis, interaction with health care professionals emerged as the most highly rated aspect at baseline (T0). This pattern was corroborated by the qualitative data, as 8 of the 10 interviewed participants expressed a positive view of nurses’ and health care assistants’ (OSS) performance prior to the intervention and did not propose modifications or report any deficiencies.

Although the aesthetic intervention led to improved ratings, the statistical analyses did not reveal a significant trend that would allow this change to be attributed to the intervention (Wilcoxon signed-rank test: $p = 1.000$; McNemar test: $p = 0.062-0.774$). A possible explanation is the high level of satisfaction observed at baseline, which left a limited margin for further improvement and may have resulted in a *ceiling effect*.





Study limitations

Given the type of study, which integrates qualitative and quantitative data within a mixed-methods approach, we sought to maintain the highest possible level of methodological rigour; nevertheless, the study has several limitations.

It was not possible to estimate an effect size for each outcome and consequently the sample size was estimated assuming a moderate effect. However, the sample size, adequate for the exploratory purposes of the study, does not allow a statistical comparison between the settings involved due to possible confounding factors generated by the heterogeneity of the settings themselves, despite the restrictive sample selection criteria adopted.

The exploratory nature of the study and the sample size limit the statistical representativeness of the results and require confirmation through appropriately sized future studies.

CONCLUSIONS

Considering the evidence emerging from neuroscience and research on how aesthetic stimuli can modify eating behaviour, this study aimed to observe and quantify the potential effects on patients of an intervention designed to enhance meal presentation in health care environments.

Building on what has been reported by several authors in clinical and care settings, a quasi-experimental exploratory study was designed, broadening observation to multiple dimensions of patients' eating experience. Although this was a pilot study, the findings suggest that an intervention to improve the aesthetic presentation of a meal may influence certain dimensions of the eating experience of patients. In particular, positive influences were found on patients' satisfaction and mood tone and, in part, on their desire to eat. Among the outcomes observed, mood—an outcome for which evidence in the literature is still scarce—showed the most relevant and significant results, both in quantitative terms and in qualitative analyses.

In contrast to the results obtained for the other dimensions, the intervention did not appear to produce an increase in caloric values, thus diverging from what has been reported by other authors. The lack of a corresponding increase in caloric intake further highlights the multidimensional nature of the phenomenon. Several biological, clinical, psychological and organisational factors, together with some confounding elements arising from the study itself, may have contributed to the reduction in caloric intake without reaching statistical significance.

With regard to the outcome of interaction with staff, a slight increase was observed that did not reach statistical significance, probably because the already high baseline ratings left only a limited margin for further improvement.

Overall, the results of this study suggest that the aesthetic aspects associated with the presentation of a meal may influence certain dimensions of the eating experience of patients, particularly those related to perceptual and emotional spheres. Although the present study does not allow definitive conclusions to be drawn about the effectiveness of the intervention, it contributes to expanding knowledge on the hedonistic aspects of food in clinical care settings and suggests the opportunity for further studies aimed at exploring more deeply the role that the aesthetic experience of the meal may play in the care pathway and in the well-being of patients.

REFERENCES:

1. Fatati G, Amerio ML. *Dietetica e nutrizione: clinica, terapia e organizzazione*. Roma: Il pensiero scientifico, 2012.
2. Vaillant MF, Alligier M, Baclet N, Capelle J, Dousseaux MP, Eyraud E, et al. Guidelines on Standard and Therapeutic Diets for Adults in Hospitals by the French Association of Nutritionist Dieticians (AFDN) and the French Speaking Society of Clinical Nutrition and Metabolism (SFNCM). *Nutrients* 2021;13(7):2434
3. Volkert D, Beck AM, Cederholm T, Cruz-Jentoft A, Goisser S, Hooper L, et al. ESPEN guideline on clinical nutrition and hydration in geriatrics. *Clinical Nutrition* 2019;38(1):10–47
4. Sironi VA, Morini G. *Le declinazioni del cibo: nutrizione, salute, cultura*. Roma: GLF editori Laterza, 2016.
5. Alonso-Alonso M, Woods SC, Pelchat M, Grigson PS, Stice E, Farooqi S, et al. Food reward system: current perspectives and future research needs. *Nutrition Reviews* 2015;73(5):296–307.
6. Wu C, Liang X, Zhao K, Zhu H, Huang C, Zhang S, et al. Ugly food, not eat: the eating intention of emotional eater for different esthetic food. *Eat Weight Disord* 2022;27(7):2889–96.





DISSERTATION NURSING®

JOURNAL HOMEPAGE: [HTTPS://RIVISTE.UNIMI.IT/INDEX.PHP/DISSERTATIONNURSING](https://riviste.unimi.it/index.php/dissertationnursing)



7. Zellner DA, Loss CR, Zearfoss J, Remolina S. It tastes as good as it looks! The effect of food presentation on liking for the flavor of food. *Appetite* 2014;77:31–5.
8. Stroebele N, De Castro JM. Effect of ambience on food intake and food choice. *Nutrition* 2004;20(9):821–38.
9. Spence C. Background colour & its impact on food perception & behaviour. *Food Quality and Preference* 2018;68:156–66.
10. Johns N, Hartwell H, Morgan M. Improving the provision of meals in hospital. The patients' viewpoint. *Appetite* 2010;54(1):181–5.
11. O'hara PA, Harper DW, Kangas M, Dubeau J, Borsutzky C, Lemire N. Taste, temperature, and presentation predict satisfaction with foodservices in a Canadian continuing-care hospital. *J Am Diet Assoc* 1997;97(4):401–5.
12. Stanga Z, Zurflüh Y, Roselli M, Sterchi AB, Tanner B, Knecht G. Hospital food: a survey of patients' perceptions. *Clin Nutr* 2003;22(3):241–6.
13. Beck M, Poulsen I, Martinsen B, Birkelund R. Longing for homeliness: exploring mealtime experiences of patients suffering from a neurological disease. *Scand J Caring Sci* 2018;32(1):317–25.
14. Beck M, Birkelund R, Poulsen I, Martinsen B. Supporting existential care with protected mealtimes: patients' experiences of a mealtime intervention in a neurological ward. *J Adv Nurs* 2017;73(8):1947–57.
15. Hannan-Jones M, Capra S. Impact of type, size and shape of plates on hospital patients' perceptions of the quality of meals and satisfaction with foodservices. *Appetite* 2018;120:523–6.
16. Beck M, Martinsen B, Poulsen I, Birkelund R. Mealtimes in a neurological ward: a phenomenological-hermeneutic study. *Journal of Clinical Nursing* 2016;25(11–12):1614–23.
17. Navarro DA, Shapiro Y, Birk R, Boaz M. Orange napkins increase food intake and satisfaction with hospital food service: A randomized intervention. *Nutrition* 2019;67–68:100008.
18. Navarro DA, Boaz M, Krause I, Elis A, Chernov K, Giabra M, et al. Improved meal presentation increases food intake and decreases readmission rate in hospitalized patients. *Clinical Nutrition* 2016;35(5):1153–8.
19. Noor Suzana O, Md Nor N, Md Sharif MS, Hamid SBA, Rahamat S. Hospital Food Service Strategies to Improve Food Intakes among Inpatients: A Systematic Review. *Nutrients* 2021;13(10):3649.
20. Blomberg K, Wallin A, Odencrants S. An appealing meal: Creating conditions for older persons' mealtimes – a focus group study with healthcare professionals. *Journal of Clinical Nursing* 2021;30(17–18):2646–53.
21. Eiseman L. Color: messages and meanings a Pantone color resource. Gloucester: Hand Books Press, 2006.
22. Souza AC de, Alexandre NMC, Guirardello E de B. Psychometric properties in instruments evaluation of reliability and validity. *Epidemiol Serv Saude* 2017;26(3):649–59.
23. Furness K, Harris M, Lassemillante A, Keenan S, Smith N, Desneves KJ, et al. Patient Mealtime Experience: Capturing Patient Perceptions Using a Novel Patient Mealtime Experience Tool. *Nutrients* 2023;15(12):2747.
24. Banks M, Hannan-Jones M, Ross L, Buckley A, Ellick J, Young A. Measuring the quality of Hospital Food Services: Development and reliability of a Meal Quality Audit Tool. *Nutrition & Dietetics* 2017;74(2):147–57.
25. Watters CA, Sorensen J, Fiala A, Wismer W. Exploring patient satisfaction with foodservice through focus groups and meal rounds. *J Am Diet Assoc* 2003;103(10):1347–9.
26. Wright O, Capra S, Aliakbari J. A comparison of two measures of hospital foodservice satisfaction. *Aust Health Rev* 2003;26(1):70–5.





27. Hamilton K, Spalding D, Steele C, Waldron S. An audit of nutritional care delivered to elderly inpatients in community hospitals. *J Hum Nutr Diet* 2002;15(1):49–58.
28. Wright ORL, Capra S, Connelly LB. Foodservice satisfaction domains in geriatrics, rehabilitation and aged care. *J Nutr Health Aging* 2010;14(9):775–80.
29. Lengyel CO, Smith JT, Whiting SJ, Zello GA. A questionnaire to examine food service satisfaction of elderly residents in long-term care facilities. *J Nutr Elder* 2004;24(2):5–18.
30. Evans BC, Crogan NL. Using the FoodEx-LTC to assess institutional food service practices through nursing home residents' perspectives on nutrition care. *J Gerontol A Biol Sci Med Sci* 2005;60(1):125–8.
31. Ncube LJ, Nesamvuni AE. South African foodservice quality: inpatient's perceptions. *Int J Health Care Qual Assur* 2019;32(2):447–58.
32. Elangovan N, Sundaravel E. Method of preparing a document for survey instrument validation by experts. *MethodsX* 2021;8:101326.
33. Andrews YN, Castellanos VH. Development of a method for estimation of food and fluid intakes by nursing assistants in long-term care facilities: a pilot study. *J Am Diet Assoc* 2003;103(7):873–7.
34. Bourrée F, Michel P, Salmi LR. Consensus methods: review of original methods and their main alternatives used in public health. *Rev Epidemiol Sante Publique* 2008;56(6):415–23.
35. Pouyet V, Giboreau A, Benattar L, Cuvelier G. Attractiveness and consumption of finger foods in elderly Alzheimer's disease patients. *Food Quality and Preference* 2014;34:62–9.





ANNEXES

Annex 1. The questionnaire. (Socio-demographic data were not included in the T1 version of the questionnaire.)

NOTE: The original questionnaire is in ITALIAN language.

QUESTIONNAIRE T-0

SOCIO-DEMOGRAPHIC DATA:

GENDER:

☐ Male ☐ Female ☐ Not reported

AGE: _____ old

REGION OF ORIGIN:

☐ Northern Italy ☐ Central Italy ☐ Southern Italy and Islands
☐ Out of Italy

EDUCATIONAL LEVEL:

☐ Primary school ☐ Middle school ☐ High school
☐ University

LENGTH OF HOSPITAL STAY (at T0):

☐ 3-5dd ☐ 6-8dd ☐ 9-11dd ☐ 12-14dd
☐ >15dd

OUTCOMES SECTION

Please mark an "X" next to the response that best reflects your opinion and personal experience.

SATISFACTION

1. How appealing is the appearance of your breakfast (e.g., colour, texture, etc.)??

1	2	3	4	5
NOT AT ALL	A LITTLE	SUFFICIENT	ENOUGH	A LOT

2. Quanto è gradevole la presentazione del vassoio della colazione?

1	2	3	4	5
NOT AT ALL	A LITTLE	SUFFICIENT	ENOUGH	A LOT





3. Does the presentation of the breakfast tray and the arrangement of the cutlery and food allow you to eat comfortably without needing assistance?

1	2	3	4	5
NOT AT ALL	A LITTLE	SUFFICIENT	ENOUGH	A LOT

4. Does your breakfast tray (including cutlery, napkins, packaging, etc.) contain everything you need?

1	2	3	4	5
NOT AT ALL	A LITTLE	SUFFICIENT	ENOUGH	A LOT

MOOD TONE

5. Do you think that a well-presented breakfast tray can improve your mood?

1	2	3	4	5
NOT AT ALL	A LITTLE	SUFFICIENT	ENOUGH	A LOT

6. What emotions or thoughts does the appearance of your breakfast (colour and texture of the food) evoke?

1	2	3	4	5
VERY NEGATIVE	QUITE NEGATIVE	NONE	QUITE POSITIVE	VERY POSITIVE

7. What emotions or thoughts does the presentation and colour of your breakfast tray evoke?

1	2	3	4	5
VERY NEGATIVE	QUITE NEGATIVE	NONE	QUITE POSITIVE	VERY POSITIVE

PALATABILITY

8. Does the appearance of breakfast (colour and texture of the food) make you want to eat??

1	2	3	4	5
NOT AT ALL	A LITTLE	SUFFICIENT	ENOUGH	A LOT

9. Does the presentation and colour of your breakfast tray make you want to eat your breakfast??

1	2	3	4	5
NOT AT ALL	A LITTLE	SUFFICIENT	ENOUGH	A LOT

10. Do you think that a well-presented breakfast tray can stimulate your appetite?

1	2	3	4	5
NOT AT ALL	A LITTLE	SUFFICIENT	ENOUGH	A LOT





INTERACTION WITH HEALTH CARE PROFESSIONALS

11. Are you treated with respect by the healthcare professionals during breakfast?

1	2	3	4	5
NOT AT ALL	A LITTLE	SUFFICIENT	ENOUGH	A LOT

12. Do you feel free to express any concerns or complaints about the food you are served?

1	2	3	4	5
NOT AT ALL	A LITTLE	SUFFICIENT	ENOUGH	A LOT

13. Are your concerns or complaints about the food taken into consideration by the nursing and support staff?

1	2	3	4	5
NOT AT ALL	A LITTLE	SUFFICIENT	ENOUGH	A LOT

14. How interested are the nursing and support staff in making sure that the breakfast service meets your expectations?

1	2	3	4	5
NOT AT ALL	A LITTLE	SUFFICIENT	ENOUGH	A LOT

