# your heart, our beat

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# Heart failure caused by cardiac tamponade with subsequent emergency thoracic reopening in the Intensive Care Unit

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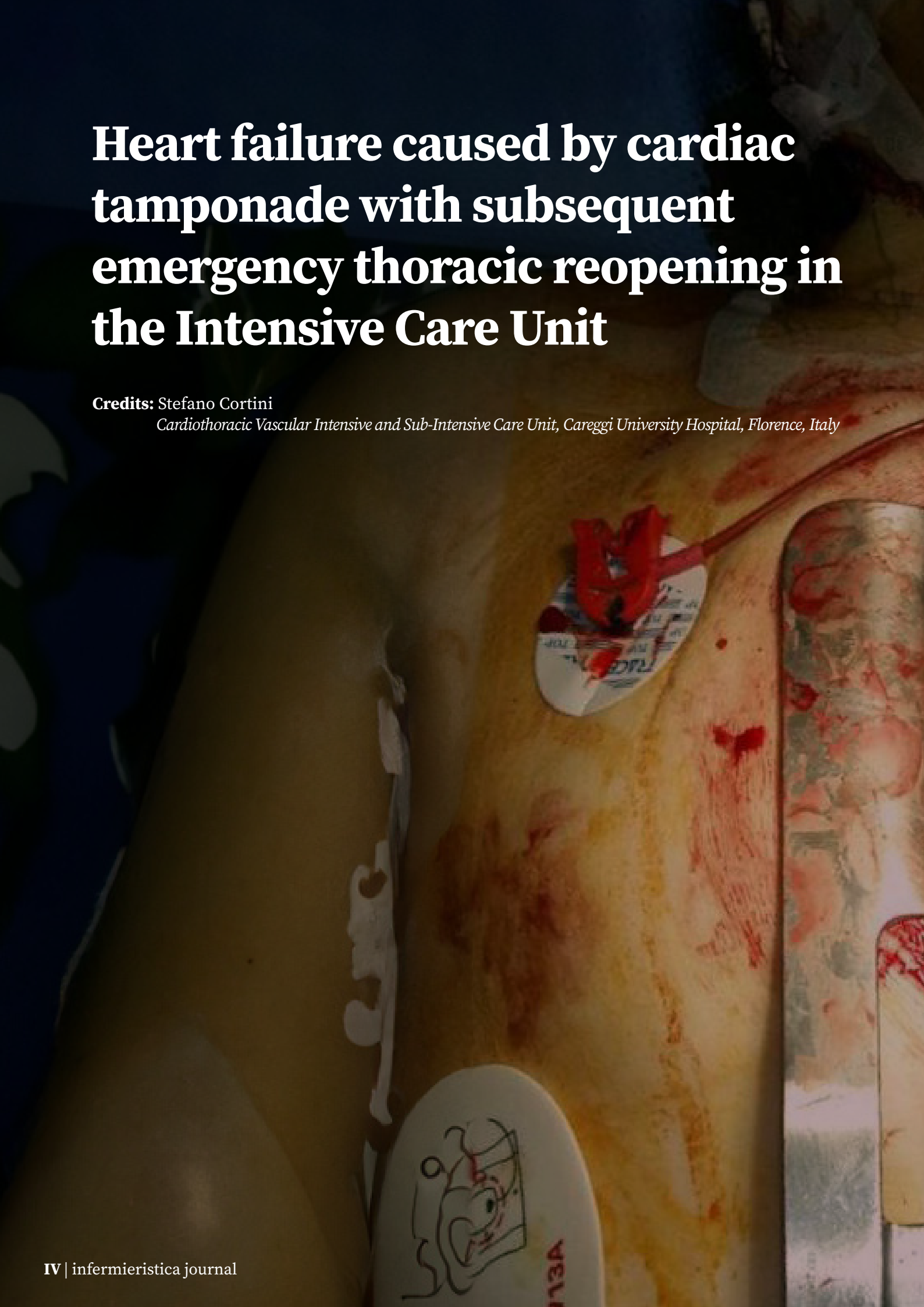

The photo shows a sternotomy performed in emergency due to cardiac tamponade. The surgery was performed in the Intensive Care Unit. Epicardial wires were used for the temporary external pacemaker: one is positioned on the anterior surface of the right ventricle and the other was positioned on the diaphragmatic surface of the left ventricle. There are three drains: one retrosternal, one toward the left pleura, and another retrocardiac. After sternotomy, part of the right ventricle and part of the left ventricle and a large clot reaching in front of the aorta are visible.

## Editorial

# The role of nurses in the multidisciplinary heart failure team: we are one but we are not the same

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In 1980 Eugene Braunwald defined heart failure (HF) as "a pathophysiological state in which an abnormality of cardiac function is responsible for the failure of the heart to pump blood at a rate commensurate with the requirements of the metabolising tissues"[1]. In 2021 Heart Failure Society of America, Heart Failure Association of the European Society of Cardiology, Japanese Heart Failure Society provided a first universal definition of HF as "a clinical syndrome with symptoms and/or signs caused by a structural and/or functional cardiac abnormality and corroborated by elevated natriuretic peptide levels and/or objective evidence of pulmonary or systemic congestion"[2].

Form a central pathophysiological viewpoint, HF represents a complex clinical syndrome resulting from structural and functional impairment of ventricular filling or ejection of blood that contribute to cause a chronically multi-systemic organ failure as consequence of both diffuse tissue hypoxia and hyper-compensatory activation of the sympathetic nervous system and the renin–angiotensin–aldosterone system (referred to as 'neurohormonal activation') that, although in the short-term restore cardiovascular homeostasis, chronically produce deleterious effects on the circulation and the myocardium[3].

The global incidence and prevalence of HF have reached epidemic proportions and the overall prevalence of HF is increasing as primarily consequence of more effective therapies of myocardial infarction that allow patients to reach a longer life expectancy. The prevalence of symptomatic HF, in the general population of both Europe and United States, ranges from 0.4% to 2%, rising exponentially with age and affecting 4% to 8% subjects over 65 years old[4].

Although the progressively increase in HF prevalence, nowadays quadruple therapy with angiotensin receptor-neprilysin inhibitor (ARNI), beta-blockers, mineralocorticoid receptor antagonist, and sodium-glucose cotransporter 2 (SGLT2) inhibitors have dramatically improved the prognosis of HF patients, extending life-expectancy by 7.9 years in a 50-year-old and by 5.0 years in a 70-year-old patient[5]. As a consequence of the extraordinary results obtained with optimized pharmacological therapy, there are both the illusion and the risk that the management of this complex disease may be exclusively limited to the prescription of life-saving drugs, thereby transforming HF centres into mere prescribing clinics. However, the complexity in the management of patients with HF requires an effort beyond pharmacological prescription and requires integrated work between different professional figures in which nurses play a central role in management and monitoring this chronic and degenerative disease with high instability rate.

In fact, collaborative working between various professions is known to help patient care and improve outcomes as part of a patient-centred approach. HF optimal management requires diverse range of professionals, including physicians, nurses, paramedics, radiographers, echocardiographers, physiotherapists, exercise physiologists, dietitians and psychologists. Moreover, in order to achieve a high-quality

care at all stages of the HF treatment, shared decision making is crucial between healthcare professionals, patients and their families.

Within this multidisciplinary HF team, nurses are crucial in recognize triggers for clinical deterioration, assess and monitor HF symptoms and signs, manage the effective use of pharmacological and device therapies, recognize the importance of co-morbidity, identify the need of strategies in the management of advanced HF, such as mechanical circulatory support and heart transplantation. Moreover, nurses play a key role offering different "transversal" supports, beyond their merely healthcare skills, such as: medical education, provide self-care and lifestyle advice (including diet, exercise and travel), and coordinate and provide care at the end of life to the patient and their family (central figure). Nurses provide a wide range of services, including providing care across different setting (inpatient, outpatient, community care, the home and remotely), organising care services in both face-to-face and the remote evaluation. To support such advances the nurse requires a skill set that goes beyond their initial education and training, for that reasons European Society of Cardiology (ESC) in 2016 proposed an HF nurse curriculum aimed to facilitate nursing staff to play a central role within the HF team[6]. Figure 1 (adapted from Riley et al.) shows objectives, professional behaviours, knowledge and skills proposed by ESC for HF nurse curriculum that nowadays represent the "ten commandments" in the training of nurses specialized in the management of patients with HF.

Even scientific evidences support the high prognostic impact of nurse in HF management. In fact, high specialized nurse-driven interventions have been shown to improve the prognosis of patients with heart failure. In fact, a network meta-analysis including 53 randomized trials published in 2017, concluded that both disease-management clinics and home visits by nurses reduced all-cause mortality compared to usual care; home visits being most effective[7]. Moreover, the results of a meta-analysis including nineteen randomized controlled trials demonstrated the beneficial effects of nurse-driven pre-discharge interventions with a mean of 32% reduction of relative risk of HF re-admissions[8].

In conclusion, nurses play a multifaceted and pivotal role in managing patients with HF, their contributions encompass assessment, education, symptom management, and psycho-social support. Teamwork with cardiologists and other healthcare professionals, combined with the integration of e-Health and telemedicine technologies, ensures a comprehensive and coordinated approach to HF management. Every team that treats and monitors patients with HF should invest in training highly specialized nurses since their contribution significantly improve outcomes and patient well-being. Taken together the above-mentioned considerations, a close collaboration between cardiologist and nurse is necessary to provide the optimal management of the complexity of HF, since, paraphrasing the words of a famous U2 song, "we are one, but we are not the same; we have to carry each other!".

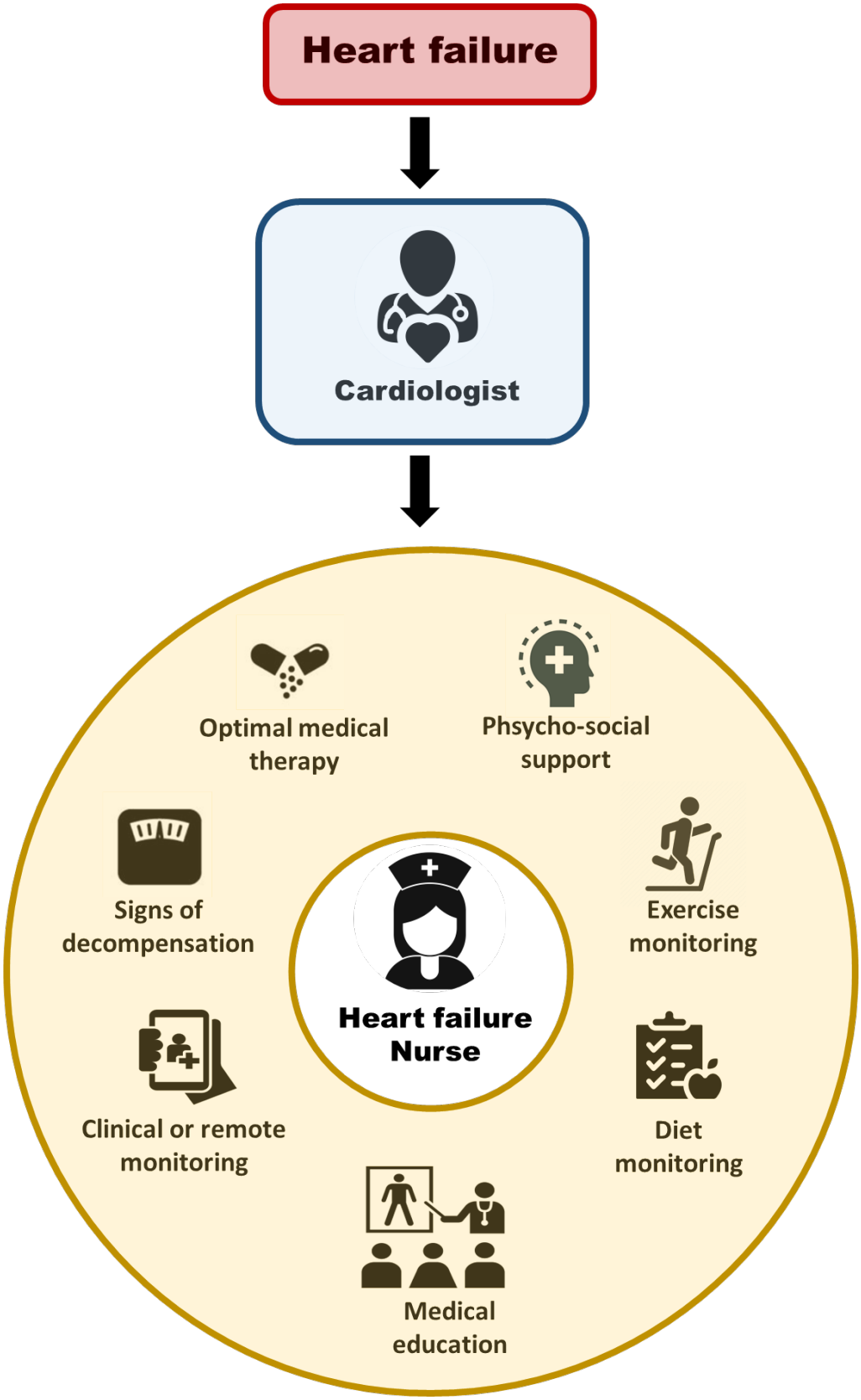
Heart failure
Cardiologist
Optimal medical therapy
Phsycho-social support
Signs of decompensation
Exercise monitoring
Heart failure Nurse
Clinical or remote monitoring
Diet monitoring
Medical education

Figure 1.

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# Emergency department nurses' competences: implementing a personal dossier for nurses onboarding, skills maintenance, and quality audit

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**Abstract**
Emergency Departments (EDs) are among the most challenging clinical settings for nurses. EDs are complex settings, including patients with various clinical severity levels, every typology of medical and surgical specialties, fast organizational responses, a triage area to identify the clinical priorities to access a medical visitation, and simultaneous emergency codes to be managed. Therefore, the issue of acquiring and maintaining adequate competencies to manage the delivery of nursing care in a multifaceted setting such as ED is central. Orientation and onboarding programs with very different characteristics in terms of content, duration, and delivery methods are present worldwide. These programs can include clinical skills self-assessment, structured learning opportunities, e-learning, development of core skills, portfolios. The possibility of integrating different educational strategies to gain knowledge with time spent in specific clinical areas to increase experience is the winning way to obtain the growth and maintenance of ED nurses' competencies. In this paper, we report on the experience (currently in progress) related to the ongoing performance evaluation of ED nurses' activities during 12 months in the Emergency Department of Careggi University Hospital. In particular, a printed annual

"Professional dossier" was designed with two-fold aim. The staff nurse holder of the booklet can handle a realistic summary of his/her activities, case mix, and time spent in the diverse clinical areas of the ED, comparing these data with opportune standards provided to make adequate comparisons and pinpoint the professional improvements that are needed. The nurse coordinator and nurse manager can use nurses' personal dossiers to know the realistic competencies load in the ED, balance the work shifts with adequate skill mix, program the rotation of nurses in the different clinical areas during the year to ease the maintenance of experience and expertise, and have a photograph of some important performance indicators for hospital personnel evaluation.

**Keywords**: Nurse Competences, Dossier, Nurse Skills, Quality

**Nurses' competencies in Emergency Department**

Emergency Departments (EDs) are among the most challenging clinical settings for nurses.

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Therefore, the issue of acquiring and maintaining adequate competencies to manage the delivery of nursing care in a multifaceted setting such as ED is central. American Nurses Association defines competence as "an expected and measurable level of nursing performance that integrates knowledge, skills, abilities, and judgment, based on established scientific knowledge and expectations for nursing practice"[1]. The Emergency Nurses Association competence definition is a little bit further on, introducing a temporal adjective and a more detailed description of the soft and hard elements that compose it; in fact, competence is "the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community being served"[2].

The competencies required for an emergency nurse (EN) are composed of a large set comprising Medical and Surgical Nursing, Orthopaedic Nursing, Neurological Nursing, Paediatric and Neonatal Emergency Nursing, Maternal/Obstetrical Emergency, Forensic Nursing, Community Health Nursing, Operating Theatre Nursing, Intensive Care/Critical Care Nursing[3]. Some strategies to identify the core activities of nurses in emergency department are provided by ad-hoc questionnaires surveying the typologies and frequencies of performed procedures, nursing diagnosis implementation and management, and organizational roles played by nurses (e.g. the Emergency Nursing Procedures Questionnaire). This approach has been used to identify the most, least, and most frequent activities on which to program competencies and skills education and assessment[4].

**Nurses onboarding and orientation in ED**

Currently no "sink or swim" approach can be used to introduce new nurses in ED settings, even in contexts characterised by low levels of resources, because of the risk of adverse events, frustration and turnover. Orientation and onboarding programs with very different characteristics in terms of content, duration, and delivery methods are present worldwide. These programs can include clinical skills self-assessment, structured learning opportunities, e-learning, development of core skills, portfolios, supported clinical development through many kinds of educational resources as Online training or face-to-face tutorials; supervised practice; working with a support person; reflecting on clinical practice; discussion forums; clinical supervision/action learning sets; ward simulation exercises; in-service education; Continuing Professional Development workshops; conferences; attending professional interest groups (e.g. wound interest groups)[5,6].

Some authors have identified different lengths of time for orientation and onboarding, according to the previous clinical experience of nurses: at least 1 month for experienced emergency nurses, at least 6-8 week for experienced intensive care nurses (with no previous experience in emergency

settings), and 3–6 months for newly hired nurses or nurses without any intensive care or emergency experience[7].

An essential part of competency acquisition is assessment. Competencies can be evaluated through different tools such as simulation, Objective Structured Clinical Examination, self and hetero evaluation, observation, demonstration and return demonstration, chart review, test, and skill checklist[8,9]. Some authors have proposed a psychometrically validated tool for the assessment of emergency nurses' competencies for self- or hetero-evaluation. This tool has been designed with the aim of detecting the quality and quantity of emergency nurses' daily practice and provides discrimination among different levels of competences through the assessment of the following variables: degree of professional competence, level of professional competence, frequency of action, autonomy, complexity of the action, and results of the actions[10].

**ED triage competencies issues**

Unquestionably, triage represents the peculiarity of nursing care in EDs since it is a hospital process performed exclusively in the emergency department. The accuracy of ED triage in identifying high-acuity patients at risk of adverse outcomes is crucial for preventing ED and in-hospital mortality[11]. Literature shows that incorrect triage evaluation affects patients' flow, ED, in-hospital length of stay, and mortality rates[12].

Therefore, special attention must be paid to the education, certification, and maintenance of competencies to play the role of triage nurses inside every single hospital. These aspects should be consistent with those of the ED triage quality improvement system. The need to establish a quality improvement system for ED triage is compelling because patients and system-hard outcomes depend on the adequacy of the triage level assignment by ED nurses. In fact, the need to assess the ability of nurses to assign the right triage levels has emerged since the adoption of triage in healthcare systems according to quality assurance programs[13]. The correctness of the triage level assignment is fundamental to prevent major adverse events in critically ill patients, and it is the first step in the ED organisation to identify the adequate streaming for patients with minor complaints, avoiding long waiting times and the risk of leaving the ED without being seen, which is one of the most important quality indicators for the effectiveness of ED organisations.

A quality improvement system for ED triage should consider several aspects: periodic revisions of the adopted triage system and the related procedure, continuing education for nurses and nurse aids, triage audit after adverse events related to under- or over-triage cases, and quality auditing of triage nurses. The last dimension should be individually fitted.

There are published experiences of quality improvement in nursing triage performance using the plan-do-check-act, focusing on organizational, relational, and educational interventions[14]. Attending educational courses is a factor that is moderately related to nurses' professional capacity in managing ED triage ($r= 0.38$, $p < 0.001$)[15]. The formal establishment of educational encounters focused on the discussion of anonymised triage clinical cases seems to be effective in improving some indicators related to triage nurses' performance[16,17,18].

However, even if experience does not show a clear relationship with adequate triage decision-making, and more evidence is needed[19], a strong rationale continues to support the irreplaceable role of nurses' clinical experience in making better clinical decisions[20]. Therefore, riage quality and accuracy are related to the experience of triage nurses; in particular, triage decision making depends on the experience and knowledge of nurses[21]. Research has shown that clinical experience is related to ED nurses' competence in performing triage ($r= 0.41$, $p < 0.001$)[15]. In addition, experience is self-perceived by triage nurses as a fundamental element of security at triage, even to support nurses who are new to this role[22]. The results from the administration of the self-report tool showed that triage competence varied according to age ($F = 9.93$, $p<0.001$), clinical experience ($F=18.82$, $p<0.001$), emergency department experience ($F=12.07$, $p<0.001$), and triage experience ($t = 4.40$, $p<0.001$). Moreover, the factors affecting nurses' triage competence were clinical reasoning competence ($\beta = 0.36$, $p<0.001$), emergency room experience ($\beta=0.21$, $p=0.006$), work-related stress ($\beta = 0.18$, $p = 0.007$), and nurse–physician collaboration ($\beta = -0.17$, $p = 0.009$)[23].

Following these streams of reasoning, the possibility of integrating different educational strategies to gain knowledge with time spent in specific clinical areas to increase experience is the winning way to obtain the growth and maintenance of ED nurses' competencies.

**The experience of Emergency Department at Careggi University Hospital**

Careggi University Hospital is a 1144 beds hospital, one of three trauma centres in Tuscany, Italy.

The Department of Nursing and Midwifery has enacted a general procedure indicating the modalities to provide onboarding and orientation for newly hired nurses or nurses who changed wards or services inside the hospital, and the related charts and documents to fill at the moments of competency assessment, which should be made at fixed intervals[24].

Since this departmental procedure covers only the general lines of action, the detailed planning of orientation and onboarding is deferred to specific clinical settings, with the possibility of implementing onboarding and orientation local programs with ad hoc tools.

Currently, Emergency Department of Careggi University Hospital has a proper procedure to ease the onboarding of nurses that includes a timely and progressive work placement beginning from the low-complexity areas, followed by the intermediate ones, and then the high complexity ones. After these steps, nurses can also have access to spending their shift in the triage area (upon attending a specific regional educational course and obtaining certification). Lastly, nurses with 2 years ED length of service and regional triage certification can attend the course and obtain certification for the advanced competencies in See & Treat.

Competencies are not limited to the acquisition process. The maintenance of competencies (composed of evaluation and enhancement phases) requires a huge amount of work, starting from the mapping of all ED and ending with quality improvement tools as individuals perform audits and clinical case reviews.

In this paper, we report on the experience (currently in progress) related to the ongoing performance evaluation of ED nurses' activities during 12 months in the Emergency Department of Careggi University Hospital.

An ED nurse with clinical and management roles related to the supervision and improvement of the clinical pathways of emergency department patients with high, intermediate, and low clinical complexities has designed an internally printed annual 20 pages pocket booklet entitled "Professional dossier" (Figure 1).

Figure 1 – Booklet "Professional dossier" main sections*


* Dummy data and information

The usefulness of this dossier is two-fold. The nurse holder of the booklet can handle a realistic summary of his/her activities, case mix, and time spent in the diverse clinical areas of the ED, comparing these data with opportune standards provided to make adequate comparisons and pinpoint the professional improvements that are needed. Standards are "expected and achievable levels of performance against which actual performance can be compared…" and determine "…the minimum level of acceptable performance"[25]. The nurse coordinator and nurse manager can use nurses' personal dossiers to know the realistic competencies load in the ED, balance the work shifts with adequate skill mix, program the rotation of nurses in the different clinical areas during the year to ease the maintenance of experience and expertise, and have a photograph of some important performance indicators for hospital personnel evaluation.

The dossier was composed of six parts. Data shown in the personal dossier were gathered from a Hospital Database called "Oracle®". This database collects information on all Emergency Department activities and processes. The six parts of the booklet are described below:

1. A cover reporting the name of the single triage nurse to provide the awareness of "taking in own hands" a personal dossier, and a sense of belonging to the unit.
2. The Introduction section provides the rationale of the booklet and the guide for consultation. The rationale focuses on the need to follow triage performance appropriateness standards provided by National and Regional regulations. The relationship between volume activities and outcomes was explained. The guide to consultation shows the three main sections of the booklet related to ED working activities during the previous year. The first is related to a summary of the number of shifts (working hours) spent by a single nurse in the different clinical areas of the Emergency Department: Emergency Room; ED Clinics for patients with various levels of triage, Short-Stay Emergency Department Observation Unit, and High Dependency Unit. This chapter provide a "photograph" of the clinical settings where the ED nurse exerted his/her competencies and enhanced his/her expertise. The second section relates to triage activities in the previous year. The last section covers See and Treat activities.
3. The page before the first section displays nurse's personal data: name, surname, date of recruitment in hospital, service number, typology of contract of employment (e.g., full time vs part time), typology of work-shifts (daily shift, versus 24-hour shifts), Emergency Department length of service, certified skills, and competencies in special clinical areas (triage, orthopedics, emergency room, See & Treat)
4. The first section is entitled 'Clinical sectors and rostering' (Figure 2).

   This section provides a complete report

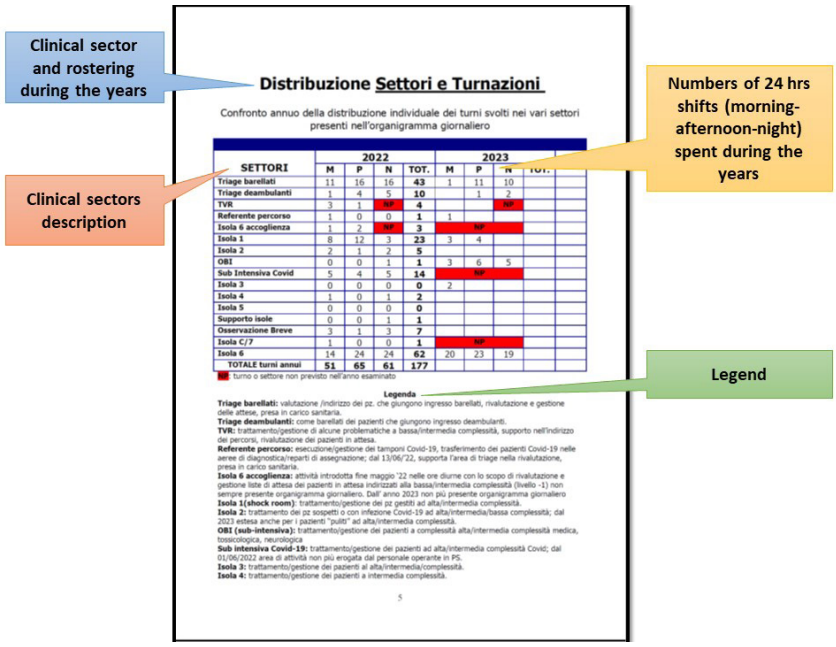


Figure 2 – Booklet "Clinical sectors and rostering" main sections*

* Dummy data and information

about the work shifts spent by nurses in the following clinical areas of the ED, playing different organizational roles: triage area for patients arriving by feet, triage area for patients arriving by ambulance, area of clinical management of minor complaints, periodical re-assessment of patients in the triage area, emergency room, clinics for different levels of clinical complexity (excluding critically ill patients), Short-Stay Emergency Department Observation Unit; ED High Dependency Unit. The shifts spent in all these areas and roles is also displayed according to the progressive clinical complexity of patients: assessment-acceptance (triage, area of clinical management of minor complaints, re-assessment of patients in the triage area); high-intermediate clinical complexity (emergency room, ED High Dependency Unit; intermediate clinical complexity (clinics; Short-Stay Emergency Department Observation Unit); intermediate-low complexity (clinics)

5. The second section covers the personal case mix of triage level assignments, comparing them with the percentages of assignments made by the total number of ED triage nurses. Moreover, the minimum standard of triage volume of activity required is indicated to allow an immediate comparison (Figure 3).

   This standard was designed through an internal benchmarking made on the personal

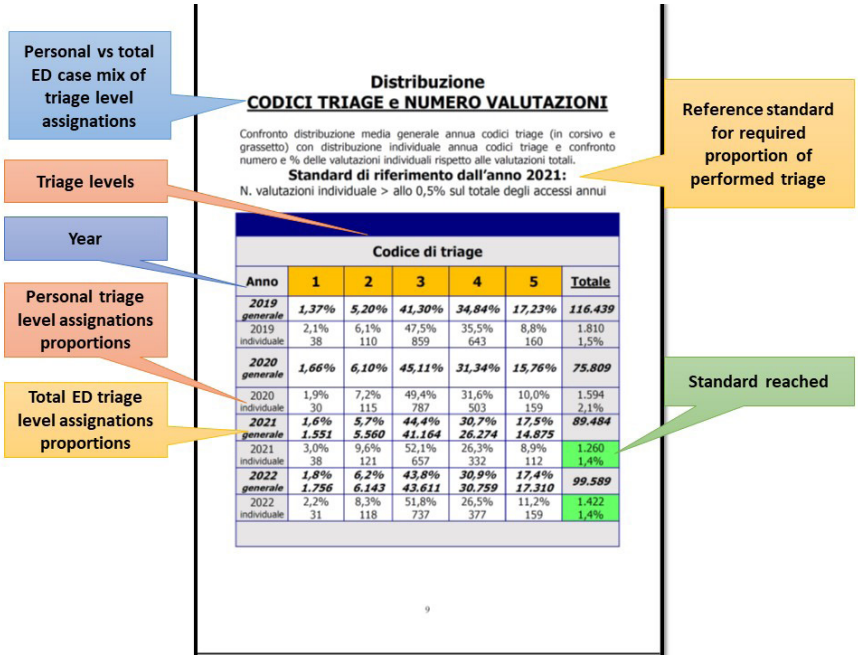


Figure 3 - Personal case mix of triage level assignations*

* Dummy data and information

triage case mix by the "best performers ED triage nurses". The next pages report the percentages of triage level assignation for every patient's main complaint compared to the percentages of levels assigned by all ED triage nurses, also showing the expected maximum standard for the "generic main presentation complaint" designed through ED internal benchmarking. This indicator serves to maintain the triage nurses' focus on the correct classification of patients' presentation symptoms according to the regional main complaints list[26]. The subsequent table displays the comparison between the percentages of triage level assignations with the related proportion of severe outcomes (in-hospital stay, mortality) and the mean percentages totalised by all ED triage nurses. These data are displayed, in addition to the values expected by the internal ED standards and those provided by the Italian Healthcare Ministry (Figure 4)[27].

6. The last section of this booklet shows the descriptive statistics of the total minor injuries and illnesses managed in the Emergency Department through see and treat. Since only a selected group of ED nurses received certification to perform See & Treat, there is a table with the percentages of their performances distributed for apparatus-related problems. This section ends with a summary list of S&T protocols, according to the organ and apparatus of belonging.

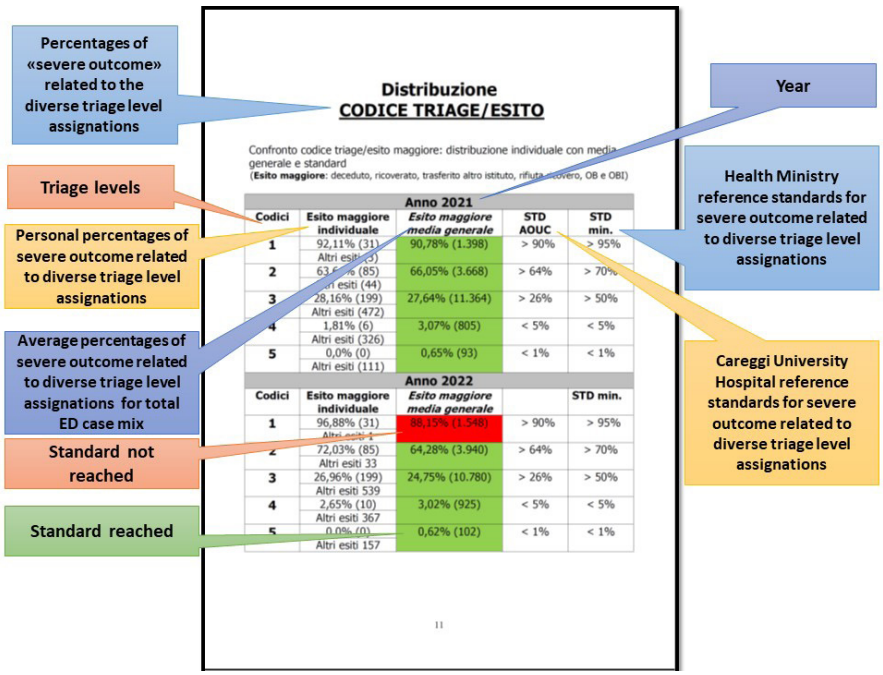


Figure 4 - Personal case mix of triage level assignations with related proportions of severe outcomes*

* Dummy data and information

## Final considerations and perspectives

At present, ED professional dossiers are in progress. There are further parameters to be implemented in this booklet: the number of patients' re-assessments after triage level assignations, during the waiting period before doctors' visit; this parameter should also be displayed for every single triage level; the number of personal case mix and special clinical procedures performed or attended during the year; the percentages of nursing score utilisation by the different clinical areas of the ED (e.g. pain assessment scales, pressure injuries assessment scales, neurological scales, etc.). In its complete shape, this booklet represents a factual portion of the professional curriculum that could be part of the personal competence portfolio and be potentially useful for further career development opportunities.

The draft of this booklet could be improved if hospital management applications were endowed with special dashboards addressing nurses' activities and tasks.

A professional dossier is a tool that should be used for personal audits, providing data that can be reviewed in the presence of a clinical supervisor, aiming to improve personal

performance. A quality review of personal performance could be accomplished through the discussion of data displayed by the booklet and possibly auditing those triage or clinical cases that the nurse has not appropriately handled[28]. The triage or clinical cases to be reviewed and discussed should be gathered during random checking-monitoring of triage activities performed by clinical supervisors.

Lastly, the booklet could also be an occasion for nurse coordinators to hold periodic meetings with all nursing staff to show and discuss data about ED patients flows, performance trends, and hypothesising some improvement points for team activities and organisation.

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## Case Report

# Amiodarone induced lung toxicity: a radiological overview that simulating COVID19 infection disease

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**Abstract:** Amiodarone-induced pulmonary toxicity (AIPT) is among the most serious adverse effects and is one of the leading causes of death associated with its use. It is a clinical pathology that is conditioned by dose, patient's age, and pre-existent pulmonary pathologies. Those effects reach a plateau at a cumulative dose bigger than 150g. Patient's comorbidities; oxygen therapy, invasive procedures or surgical interventions can trigger the pulmonary symptoms induced by amiodarone toxicity. The increased risk of developing amiodarone-induced pulmonary fibrosis is directly related to the dose and the duration of the intake. Despite significant advances in the understanding of AIPT, its aetiology and pathogenesis remain incompletely understood. The role of steroids in the management of pulmonary toxicity from amiodarone is debatable, however, most reports of improvement after amiodarone withdrawal differ little from those in which concomitant steroid therapy was employed. Therefore, the addition of therapeutic doses of corticosteroids in amiodarone-induced pneumopathy may be indicated. Typically, prednisone is started in doses of 40 to 60 mg/day orally and slowly reduced. Again, the pharmacodynamics of amiodarone dictate a treatment period of four to 12 months. The case report describes a patient with AIPT who after therapy with Prednisone at a dosage of 50mg/day by gradually scaling down the doses as reported in the above clinical studies, had a clinical, functional and CT radiological

picture that was markedly improved with disappearance of most of the scattered ground glass areas and the previously reported thickening with associated bi-apical fibrotic outcomes.

**Keywords:** AIPT, Amiodarone-induced Pulmonary Toxicity, Amiodarone, Hyper-reactivity, OCS, Ground Glass Opacity

## Introduction

Amiodarone is an effective antiarrhythmic that is often used in the perioperative period after cardiac surgery. The drug can create significant adverse reactions. After the first dose, amiodarone reaches its plasmatic peak levels in 3 to 7 h. The onset of action can take from a few days to a few weeks. Biodisponibility can be influenced by age, liver pathology and interactions with other drugs or substances that can inhibit or stimulate cytochrome P450. Because of the lipophilic structure, both amiodarone and its metabolites accumulate in high quantities in tissues and interact with the phospholipid's metabolism. These tissues are represented by adipose tissue and well-perfused organs: liver, lung or skin tissue. The most frequent affected organs by the accumulation of amiodarone and, respectively, the high risk of developing injuries induced by amiodarone are the eyes (cornea deposits, photophobia), the thyroid gland (hypo/hyperthyroidism), the liver (drug-induced hepatitis, dyspeptic syndromes), the skin (photosensitivity) and the nervous system (peripheral neuropathy). Although the lungs are rarely affected (approximately 4–6% of all complications), pulmonary injury has the most clinically significant impact, which can lead to the patient's demise[1]. Evidence from the scientific literature has highlighted the fact that cells of the innate immune system as well as the adaptive one and the mediators that these cells release cause the appearance of interstitial changes. Macrophages are phagocytic cells belonging to the innate immune system. Present in all tissues of the body, most commonly in the lung and liver, macrophages function as immune sentinels, with the aim of defending the body against pathogens and injuries[2]. Resident macrophages are distinct from bone marrow-derived inflammatory macrophages that accumulate in tissues in response to injury or infection. Inflammatory macrophages are mainly involved in the development of pulmonary fibrosis. Macrophages have been classified into M1-pro-inflammatory/cytotoxic and M2-anti-inflammatory/reparative, which develop in response to signals present in the tissue microenvironment[3]. Amiodarone-induced pulmonary toxicity (AIPT) is the most serious adverse effect and a major cause of death. AIPT is classified as acute, subacute, and chronic[4]. It can frequently develop within the first 1 to 1.5 years after the start of therapy and occurs quickly in patients using high doses of amiodarone. Signs and symptoms of AIPT are non-specific and are general malaise, dry cough, pleuritic chest pain and progressive dyspnoea, accentuated if drug-induced hyperthyroidism is present. The pattern for drug-induced lung injury may vary in many forms, but amiodarone can cause polymorphous injuries such as diffuse alveolar damage (DAD), chronical interstitial pneumonia (CIP), organizing pneumonia, pulmonary hemorrhage, lung nodules or pleural disease[5]. Amiodarone therapy also interferes with other drug classes, such as warfarin, simvastatin, atorvastatin as well as antiretroviral medication used in patients with HIV. Considering these facts, and the frequent use of amiodarone in medical practice, physicians must know the indications, contraindications, dosage, adverse effects, and drug interactions of amiodarone treatment. Usual doses between 200–600 mg/day have minimal hemodynamic adverse effects. They cause a negative inotropic effect related to the administered dose by reducing systemic vascular resistance[6]. It has no effect on the ejection fraction of the left ventricle, andarterial hypotension rarely occurs during oral treatment with amiodarone. Diagnosis is possible if there are clinical manifestations in the lungs, thyroid, liver, and eye. Laboratory tests show increased erythrocyte sedimentation rate (ESR), leucocytosis, increased lactate dehydrogenase (LDH) and circulating eosinophils. On chest CT the following are present: areas of alveolar, interstitial, or mixed alveolar-interstitial ground glass opacity[7]. Lung involvement in asymmetric or bilateral form, reticular and perilobular interstitial opacities, basal traction bronchiectasis one or more sub-pleural nodules (6-12%), pleural thickening with pleuritic chest pain or chafing on physical examination, sometimes dense, bibasilar, and reticular opacities, with gross crackles on chest auscultation, significant

hypoxaemia, and weight loss. The response to corticosteroids is widely debated in terms of efficacy, as the disease is irreversible and has a negative prognostic impact on the patient. Lung function tests in most cases reveal a restrictive type of abnormality, with reduced DLCO values, the latter being greater in patients with pre-existing lung disease such as COPD[8].

**Clinical case presentation**

The patient is a 67 years old Caucasian female, former 30-year smoker of 10packs/years, with recent admission on December 2022, to the emergency department for dyspnoea, febrile serotinous episodes. On Anamnesis: oesophageal jatal hernia, in July 2022 episode of SARSCOVID19 infection with pauci-symptomatic evolution and no recovery, chronic atrial fibrillation and previous surgery for aneurysm on therapy for about two years with amiodarone at a dosage of 200mg/day, allergy to amoxicillin/clavulanic acid denies environmental exposure to moulds and does not keep farm animals. On echocardiography: cardiac ejection fraction: 62%, mild mitral valve insufficiency. At thyroid ultrasound: diffuse nodular formations, some cystic and thyroid enlarged in volume. On blood examination: ESR: 120 CRP: 13.9, LDH: 683 Positive faecal occult blood, TSH: 12 Anti-thyroglobulin antibodies: 107, Vitamin D: 17.9, WBC: 11,850 with neutrophilia: 7,610 cells and eosinophilia: 1230 cells Swab for SARSCOV2 negative. On thoracic examination: vital parameters normal except for peripheral oxygen saturation: 93% in room air, reduced vesicular murmur with bilateral "Velcro-like" crepitations, hypo transmitted tactile vocal tremor bilaterally, clear pulmonary sound. The Global spirometry at time zero, showed moderate restrictive pattern (Table 1).

I decide to start with ICS/LABA 2 x 2 /die and therapy with OCS Prednisone 25mg BID for 20 days9 then reduced to ½ cp BID for 20 days then reduced to ¼ cp BID for 30 days then reduced to ¼ cp/day until next clinical and spirometry check at 3 months, antibiotic therapy with quinolone and macrolide for 8 and 6 days. Blood gas analysis performed subsequently showed no hypoxaemia. At the clinical spirometry at 3 months, the spirometric functional values had improved, persisting mild restrictive pattern (Table 1), with the presence of +45% PEF (indicative of bronchial hyper-reactivity); and +18% of TLC. The CT scan at time zero and at three months post-therapy showed (Figure 1 from A to I): "Extensive areas of Ground Glass thickening are noted in both parenchyma, predominantly centre-lobular, more extensive on the right side, a picture compatible with non-specific interstitial pneumopathy. The finding is in significant regression compared with the previous examination performed 3 months ago with some small lymph nodes in the mediastinum (14mm maximum diameter)". On blood examination at 3 months: ESR: 115 CRP: 2, LDH: 468, WBC: 8,000 with neutrophilia: 5,160 cells eosinophils: 230 cells. The patients have no previous spirometry and CT scan after infection of SARS COVID19.

Discussion: Amiodarone-induced pulmonary toxicity is conditioned by dose, patient's age, and pre-existent pulmonary pathologies. The pattern for drug-induced lung injury may vary in many forms, but the amiodarone can cause polymorphous injuries such as diffuse alveolar damage, chronical interstitial pneumonia, organizing pneumonia, pulmonary hemorrhage, lung nodules or pleural disease[10]. The pathological mechanism of pulmonary injury induced by amiodarone consists of the accumulation of

| Global Spirometry time zero | Global Spirometry at three months |
|---|---|
| FEV1/FVC: 125% of predicted value | FEV1/FVC: 120% of predicted value |
| FVC: 79% of predicted value | FVC: 88% of predicted value |
| FEV1: 100% of predicted value | FEV1: 73% of predicted value |
| PEF: 78% of predicted value | PEF: 123% of predicted value (+45% of predicted value) |
| FEF25-75: 242% of predicted value | FEF25-75: 201% of predicted value |
| TLC: 56% of predicted value | TLC: 74% of predicted value (+18% of predicted value) |

Table 1. Time zero global spirometry where you can see a moderate restrictive pattern, and new global spirometry at three months of therapy where you can see mild restrictive pattern with improves of PEF and TLC.

**Legend:**

FEV1%: Percentage of predicted value of FEV1

FVC%: Percentage of predicted value of FVC

FEV1: Maximum Expiratory Volume at first second

FVC: Forced vital capacity

TLC: total lung capacity

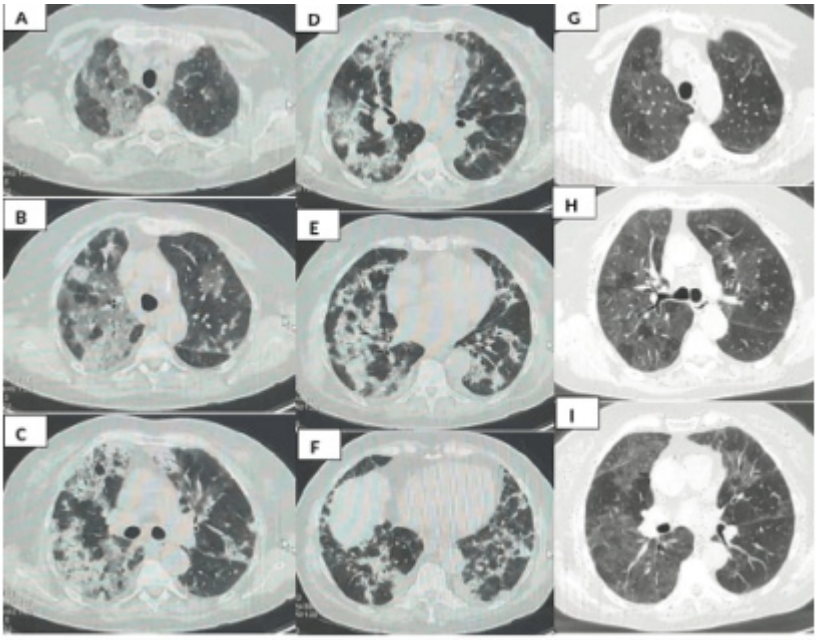


FIGURE 1: A: Time zero chest CT scan showing areas of bilateral apical centrilobular consolidation with thickening of the pulmonary reticular interstitium of the intra- and interlobular septa, with predominance in the right apical areas. B: Time zero chest CT scan showing areas of bilateral apical centrilobular consolidation with thickening of the pulmonary reticular interstitium of the intra- and interlobular septa, with predominance at the right apical zones with presence in both lungs at the submantellar zones of solid centrilobular consolidations. C: Chest CT scan at time zero showing areas of right perilobular consolidation with thickening of the reticular pulmonary interstitium of the intra- and interlobular septa and prevalence in the right middle field of areas of solid centrilobular consolidation. D-E-F: Time-zero chest CT scan showing areas of peri- and mid-basal centrilobular consolidation prevailing on the right, thickening of the reticular pulmonary interstitium intra- and interlobular septa, and predominance in the mid-right field of areas of solid centrilobular consolidation. G-H-I: Chest CT scan carried out at three months of therapy with an oral corticosteroid, inhaled corticosteroid, and a long-acting bronchodilator, showing apical, middle, and basal areas almost complete regression of the areas of

phospholipid complexes in histocytes and type II pneumocytes. Differential diagnosis of pulmonary fibrosis induced by amiodarone is made mainly with idiopathic pulmonary fibrosis, left ventricular failure or infectious disease[11]. From a functional point of view, a moderately restrictive type of pattern is frequently highlighted, with a decrease in forced vital capacity (FVC) and a moderate decrease in the diffusing capacity for carbon monoxide (DLCO) in approximately 45% of patients[12]. A nonspecific inflammatory syndrome can also be highlighted, characterized by a mild leucocytosis, increased erythrocyte sedimentation rate and increased C-reactive protein (CRP) value, but these are nonspecific and are associated with interstitial inflammation[13]. Amiodarone-induced interstitial lung damage includes varying forms of presentation, from mild to moderate/severe[14]. These include organizing pneumonia, interstitial pneumonitis, or respiratory failure. Evidence from the scientific literature has highlighted the fact that cells of the innate immune system as well as the adaptive one and the mediators that these cells release cause the appearance of interstitial changes[15]. Macrophages are phagocytic cells belonging to the innate immune system[16]. The typical presentation of amiodarone-induced lung damage is subacute, with dry cough, progressive dyspnea, low-grade fever and weight loss[17]. The incidence of these complications has decreased considerably with the use of reduced doses, but nevertheless, in some cases, the clinical presentation is acute and may be life-threatening[18]. Although the adverse effects produced using amiodarone are known, the adherence of medical staff and patients to the guidelines for monitoring therapy is poor. Worldwide, there are medical centers where it is possible to determine the serum level of amiodarone. Values higher than 2.5 mg/L are indicators of a high level of toxicity[19]. Pulmonary functional exploration highlights a restrictive syndrome. DLCO decreased by 15% advocates pulmonary toxicity in a patient under amiodarone treatment[19]. Although amiodarone is a potent antiarrhythmic, studies in the specialized literature have demonstrated the occurrence of pulmonary toxicity associated with this treatment[20]. The increased risk of developing amiodarone-induced pulmonary fibrosis is directly related to the dose and the duration of the intake. The prevention of adverse effects is the responsibility of the entire team that interacts with the patient: the attending physician, the one who prescribes the treatment, primary care physician, specialist physician and pharmacist[21]. The multidisciplinary approach remains essential to improving the quality of life and the patient's outcome[22]. Effective follow-up of the patient after initiation of amiodarone therapy involves responsibility on the part of the entire medical team as well as the patient. Current

information and effective communication between patient and doctor are essential for further development[23]. The effects of amiodarone are multiples and pleiotropes, interested many organs like thyroid, eyes, kidneys, liver and lungs, so for that it is important to evaluate all kind of districts that are interested from toxicity of this drug.

**Conclusions**

The patient improved functionally, instrumentally, and clinically on continuous steroid therapy. Bronchoalveolar lavage was not performed in that case presented. The diagnosis of pulmonary toxicity induced by amiodarone is difficult, it is a diagnosis of exclusion, based on clinical phenomena of respiratory insufficiency, imaging interstitial type affection, sometimes even usual interstitial pneumonia, which makes the differential diagnosis with idiopathic pulmonary fibrosis and/or biological. Early recognition of respiratory complications induced by amiodarone treatment and intensive treatment can cause a favourable evolution of the patient. Any delay in discontinuing amiodarone treatment when there is clinical suspicion may lead to an unfavourable prognosis for the patient. Further imaging and functional monitoring (volumes and respiratory flows) is mandatory. The role of steroids in the management of amiodarone pulmonary toxicity is debatable, but the clinical resolutions of the clinical case are no different from discontinuation of the drug and monitoring over time. Patients who have developed drug toxicity have been reported to have maintained it at the same or lower doses, improving with the addition of steroids. An exact dose or duration of treatment has not been established. Regimens of 0.5–1 mg/kg of prednisolone with gradual tapering are usually prescribed for months, often for a period of 1 year. Tapering of corticosteroids depends on the response time of each patient, since there is evidence that amiodarone remains in lung tissue even 1 year after discontinuation of the drug. Caution is needed in the gradual reduction of corticosteroids. Cases of aggressive disease relapse have been described after reducing the dose of prednisolone by over 5 mg daily or even 8 months after complete cessation of treatment. In cases where amiodarone is considered absolutely essential for its antiarrhythmic properties, regimens with the lowest possible dose of amiodarone in combination with corticosteroids have been successfully used. Despite treatment, disease may progress to irreversible pulmonary fibrosis and/or death in certain refractory or fulminant cases. In respiratory failure, oxygen therapy or even mechanical ventilation are applied as necessary. Furthermore, the administration of a wide spectrum antimicrobial therapy initially is required until respiratory infection is reliably excluded. Therefore, the addition of corticosteroids in AIPT may be indicated. Prednisone is started at doses of 40 to 60 mg/day orally with progressive de-escalation. The pharmacodynamics of amiodarone dictate prolonged treatment for four to 12 months.

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Research

# The factors obstaculating adherence to the gluten free diet in the youth bands: an observational study

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**Abstract**

**Introduction.** Celiac Disease (CD) affects the small intestine and it's characterized by a high sensitivity to gluten. Among the main signs and symptoms, there are typical or intestinal ones such as abdominal pain, abdominal swelling, diarrhea, weight loss, atrophy of the intestinal villi. At the moment, the only effective therapy is to follow a gluten-free diet during a long-life. The aim of the study is to investigate the difficulties of adherence to gluten free diet (GFD) in young people with CD.

**Materials and methods.** A questionnaire was administered to the population under study (15-30 years), between 9 July 2022 and 29 August 2022. The interviewees answered 28 questions: 5 concerning the socio-demographic variable, 23 concerning the difficulties of adherence to the GFD.

**Results.** Two hundred and twenty-seven people answered the questionnaire. Among them, a low percentage was sent to the attention of a dietician or psychologist. 78.8% prepare their own meal independently. 78.4% believe they know the foods allowed and 93% say they strictly follow the diet.

**Discussion.** Following the GF diet is a challenge for most young people with CD. Restaurants offering GF meals are limited and this could be a reason for opting out leisure and socializing, or in the worst-case scenario, the person with CD is forced not to join the GFD. The risk of contamination that can involve fear, isolation, embarrassment in asking questions, is another factor to consider.

**Conclusion.** Adherence difficulties begins with the CD diagnosis and continue with the entry of patients into the "gluten-free" world. The main problem in related to the social setting of young people, who wants to live without complications due to shortage of places with gluten free (GF) food. In future studies, the literature may address difficulties with adherence, rather than quality of life and

CD-related behavior. It's necessary to improve the attention on GF world to decrease discomfort about medical conditions.

**Keywords:** Celiac Disease, Gluten Free Foods, Gluten Free Diet, Adherence Difficulties

**Introduction**

Celiac disease (CD) is a chronic immune mediated enteropathy which affects small intestine and it's characterized by an high sensitivity to gluten. This lead to systemic clinical manifestations and affects who is genetically predisposed[1]. The immunogenic component of gluten is the gliadin that, in genetically predisposed people, triggers an innate cell mediated immune reaction. It leads to atrophy and flattening of intestinal villi. This molecule is present in various cereals, such as barley, wheat, rye, spelt and kamut[2].

CD can occur in different ways: paucisintomatic (subclinical) or, in typical forms, with severe intestinal disorders (abdominal pain, diarrhea, swelling and weight loss). Atypical or extra-intestinal forms exist and they can cause delayed growth of children, anemia, osteoporosis, non-specific abdominal disorders, ataxia, neuropathy, alopecia areata, psoriasis and dermatitis herpetiformis[3,4].

Nowadays, subclinical and atypical cases are respectively 30% and 40-60%[5,6].

CD seems to have a familiar component: in fact, its frequency increases in close relatives (5%), up to 20% of cases among brothers, parents and children. Immunogenetics assumes a correlation with DQ2 or DQ8 heterodimer (genes on the surface) codified by HLA (Human Leukocyte Antigens) system of II class[5].

CD diagnosis begins with the evaluation of clinical manifestations in response to a gluten free diet. Then, the presence of the specific autoantigen tissue transglutaminase (TG2) and anti-endomysial antibody (EMA) are searched. TG2 is very sensitive (95%) and cheap, which make it the most common test for the diagnosis and CD tracking. EMA is more specific and is used to confirm the diagnosis. Duodenal biopsy is still the standard test to confirm the diagnosis[7].

Literature data estimate a prevalence of celiac patients of about 1% both in Europe and USA, with an increase of diagnosis average age (30-40 years old) and a rate female/male of 3:1[7].

The increase of numbers of diagnosis is due to higher sensitivity of diagnostic tests and screening introduction. Various authors sustain that CD may be linked to the mediterrean diet, which lead to a gluten intake of about 20 g/die. Moreover, the quality of gluten is being studied because new industrial food variants may be involved in increasing of disease cases[8]. These theories don't find current evidence, so risk factors remain unknown[9].

Currently, the only effective treatment is a rigorously gluten free diet (GFD). After the diagnosis, patients are directed to the dietician for follow-up so that they can receive useful information for everyday life. To improve theurapeutic adherence to GFD is endorsed to participate actively to support groups or associations[9]. In fact, especially in young people, it can be difficult to follow a GFD. During childhood, parents choose what to eat for their children, while since adolescence people acquire freedom and choose themselves what to eat. This can represent one of the reasons of therapeutic non adherence[10]. From here one can deduce that a teenager may have a lot of problems to follow a GFD, because he spends more time with peers than with family.[8] Moreover, he can be stressed and feel various emotions, from the fear of possible contamination to rage and embarrassment, he can be afraid to make incorrect decisions about the feed or feel different than friends, peers, classmates or colleagues[11].

From several bibliographic searches, a lack of information about main obstacles and daily difficulties that a young celiac adult can come across, appears. It happens because adherence level is mainly studied, together with the behaviour resulted and not the real daily difficulties[12].

In literature, quality of life of celiac young people is explored, without an evaluation the possible causes that lead to a non-adherence to a GFD[12].

The objective of the study is to investigate the real difficulties to follow a GFD in a sample of celiac young people (15-30 years old).

## Materials and methods

Between 9 July 2022 and 29 August 2022, a questionnaire (available upon request) was administered to a sample of 15-30 years old people with CD (n=227) to evaluate the adherence difficulties to GFD.

The tool was created by the analysis of 8 articles[12,13,14,15,16,17,18,19] and, subsequently setting to the reality of the study. 28 questions were planned, of which 5 to evaluate sociodemographic variables and 23 to evaluate the adherence difficulties to GFD. The form was administered online with Google Moduli®. The tool was shared on social media to reach the sufficient sample of convenience size to provide data to make inference on population. Each response received was received by email from the authors and reviewed, but never published to ensure privacy. The expected time to complete the form was about 3 minutes. Sample characteristics are resumed in Table 1.

| **Age (years)** | % | | | |
|---|---|---|---|---|
| 10-20 | 32 | | | |
| 21-30 | 55,5 | | | |
| 31-40 | 7 | | | |
| 41-50 | 5,4 | | | |
| **Gender** | **Female (%)** | **Male (%)** | | |
| | 84,6 | 15,4 | | |
| **Profession** | **High school students (%)** | **University students (%)** | **Workers (%)** | |
| | 20, 7 | 44,1 | 40,5 | |
| **Region of origin** | **North Italy (%)** | **Centre Italy (%)** | **South Italy (%)** | |
| | 52,42 | 26,43 | 21,15 | |
| **Age at diagnosis** | **% <10 yo** | **% 11-20yo** | **% 21-30yo** | **% >30yo** |
| | 40,09 | 33,92 | 21,59 | 4,41 |

## Results

227 people with CD answered the questionnaire. Among them, 34 didn't meet the criteria of inclusion. So, a sample of 193 subjects was considered.

53,7% of surveyed people wasn't take in charge by a dietician or a nutritionist after diagnosis phase. Among 112 patients to whom advice has been requested, only 28% has received an evaluation by a nutritionist, while 26,4% by a dietician. For 91.6% of cases, a visit to a psychologist was not considered.

From the questionnaire, 62,1% of participants prepare meals themselves. Parents take care of their children diet in 73,6% of cases. A minority of the sample (8,4%) buy pre-packed GF meal.

78,4% of young adults believe to be very familiar with foods to eat daily. The prevalence of going out to eat with friends is on one or two times a week (43,6%), even if 70,5% of the interviewed declares that the choice of premises with GF option is limited. As regards GFD adherence, 93% affirms to follow it strictly because it carries wellness, even if it is considered a diet which requires a constant effort. 51,5% of the sample asks information about food content without embarrassment while eating outside, instead 41,4% feels ashamed and remaining 7% a priori doesn't ask question because it feels uncomfortable (Table 4). 86,8% of the interviewed reads carefully food labels (Table 2), but 63,9% affirms that the labels are often not easy to understand (Table 3). As regards lunch outdoor (canteen, office, breaks), 77,3% declares to feel more confident to have GF food or snacks.

Table 2. Sample attention to gluten presence (n=227)

| | |
|---|---|
| You don't control if there are GF meals because you're not interested | 1,3 % (3) |
| Others (parent, relatives) do it for you | 11.90 % (27) |
| You always read the labels | 86,80% (197) |

Table 3. Perception on dietary advice clarity

| | |
|---|---|
| Sometimes, they are incomprehensible | 3,10% (7) |
| They're not always easy to read | 63,90% (145) |
| They're easy to read | 33,0% (75) |

Table 4. Description of dietary habits outside of the family context

| | |
|---|---|
| You don't ask information because you feel embarrassed | 3,10% (7) |
| You feel embarrassed with your friends to ask information on food, but you do it | 63,90% (145) |
| You ask information on how food in prepared, without embarrassment | 33,00% (75) |

**Discussion**

Various aspects influence GFD in young adults affected by CD and through this study it was possible to assess obstacles after diagnosis. Generally, impulsiveness that characterizes most young people causes almost immediately rebelliousness towards GFD[20]. Over time, if no interventions are carried out, this ostility turns into isolation, embarrassment, rage and feeling of diversity from peers[21]. This leads to a low problem-solving skills and to find compensation strategies that often don't coincide with clinical needs[22]. At first, it's diriment that the person is stimulated to plan, organize, prepare independently meals and take it with him if necessary. It's fundamental to always remember that, as demonstrated by interviewed, most of the sample substains to know which food they can eat, but literature has repeatedly demonstrated that patient mastery about their feed does not always reflect reality[21].

From questionnaire results, that the offer of places offering gluten-free food is still limited and, for young adults who going out - as declared - 1-2 times a week, it can be a reason of cancellation of outings with friends or, at worst, to oblige the person to adapt and to eat food with gluten. Even if data about intentional consumption of gluten is irrelevant and almost all of the respondents sustains to follow a strictly diet, eating out home represents a critical factor both for precedent reasons and of possible unintentional contamination of food in GF premises.22 This last problem begins a problem which explains the reason why there are few places where a person affected by CD could have a GF meal. In fact, contamination risk, the taste of gluten-free foods and the high cost of

raw materials can be considered limitations for restaurant managers, and they have to face when they decide to offer a GF choice (school canteen included).23

This means that the person, as demonstrated by analyzed data, feels safer to prepare independently his meal, bearing a burden even in moments of conviviality and entertainment. It's necessary to try to imagine these difficulties during a travel where language and logistic difficulties are added.

Even if, as a Canadian study affirms33, concern after diagnosis, symptoms related to gluten intake, and the need to gain weight after a gluten diet lead the person to a condition where he's obliged to follow a GFD, analysed limits impose a reflection on possible lack of adherence to a therapy, especially in a young population. Teenagers fall into the most risk category as regards the difficulty in adhering to a diet and emotional support is fundamental to prevent this risk. Some factors, such as familiar context and parents' instruction level, may influence behavior of young people and this makes the family very important. In fact, different studies aim to better understand the pathology both to parents and others family components: their role is important to support them and to help them feel less isolated, faciliting social life aspects seen like a big obstacle from celiac people.24-27

After the diagnosis, there are few individuals to whom a dietician/nutritionist consultant is recommended and this data is alarming when it comes to psychological support. In literature, the need to attend a specialist visit after diagnosis is demonstrated: this because a healthcare professional could evaluate a possible risk of non adherence and intervene early29. The professional nutrition expert could implement a path of therapeutic education on GFD, while a psychological support allows to face daily life20,28 and to improve adherence, even in the long term.29, 30

From the survey, in most cases, parents prepare meals for their children, so it's important to involve families in the support path outlined. It's fundamental that families are aware of tax deductions applicable (DM 4 may, 2006, Italy) to GF food and are addressed to a common food style for all the component. To avoid difference in home environment is surely a decisive factor on a psychological level, since the acceptance of their condition has deep roots in the family.24 A strictly gluten free diet may lead to nutritional imbalances because GF products contain less fiber. Another risk is to try to compensate dietary restrictions by introducing high-calorie foods with high sugar content, fats or high protein foods (eggs, meat, snacks), leading to an increase in weight.31

**Conclusion**

GFD adherence difficulties begins with the CD diagnosis and eith the nursing care. The main problem is related to the social setting of young people, who wants to live without complications due to shortage of places with GF food. Literature should investigate about adherence difficulties, instead of quality of life and behaviour CD related. It's necessary to improve the attention on GF world to decrease discomfort about medical conditions.

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## Cultural Article

# Harnessing the sweet potential: the revival of honey dressing in modern wound care

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**Abstract**
Honey dressings have found wide application in the past and are currently experiencing a resurgence due to their beneficial properties, which aid professionals in their daily practices. Manuka honey possesses properties that are suitable for debridement of chronic wounds, stoma-therapy, and burns. This cultural article aims to review the major literature and benefits of medical honey dressing and underline five important implications (i.e., alternative care for individuals experiencing antibiotic resistance, ease of application, faster healing, shorter hospital stays, and economic convenience in countries characterized by high financial constraints) that at this stage are underdeveloped in the literature.

**Keywords:** Honey, Manuka, Wound-care, Nursing

Throughout history, honey-based remedies have been utilized for many centuries, particularly for wounds that underwent secondary intention healing. The development of modern medicine has resulted in a decrease in the use of honey but its activity on wound healing has become popular again in recent years. However, the specific processes by which honey operates on the wound bed have only recently been elucidated[1].

The utilization of honey as a medicinal treatment

for wounds can be inferred from archaeological discoveries and early written records, suggesting its application by ancient civilizations such as the Egyptians, Greeks, and Romans 1. The Ebers papyrus (1550 BC) is one of the earliest documents that references the use of honey, specifically in remedies[2]. Both the Bible and the Koran depict honey in a commendable manner, referring to it as a source of nourishment, a drink, and a medical remedy[3]. Primarily, it was utilized in the medical domain for the purpose of managing digestive ailments and formulating topical preparations for the treatment of wounds or injuries. For centuries, it has been utilized as a remedy for insomnia due to its hypnotic properties[4].

Hippocrates, a prominent Greek scientist, advocated for a simple dietary plan that incorporated the ingestion of honey in various forms. Furthermore, he utilized honey for many different purposes including the management of alopecia, birth control, wound repair, cathartic properties, respiratory distress, and discomfort[4].

The honey has extracted from the Leptospermum scoparium (tea tree), a plant that grows in New Zealand and was commonly called "Manuka". Bees extract the honey from the pollen of Manuka's corollas. Because of the presence of the methylglyoxal (MGO)[5,6,7], a carbonyl compound that serves as an active ingredient, the Manuka honey is characterized by potent antimicrobial and anti-inflammatory properties even at low concentrations[4,8,9]. In detail, the Manuka honey has demonstrated efficacy against a variety of bacteria commonly present in wound infections, including Staphylococcus Aureus, Pseudomonas Aeruginosa, MRSA (Methicillin-Resistant Staphylococcus Aureus), and VRE (Vancomycin-Resistant Enterococcus).

For these reasons, medical honey dressings have gained recognition in the global academic community in the last years[10,11]. The antimicrobial properties of honey are derived from the osmotic dehydration mechanism, the reduction of pH levels to approximately 3.0-4.0[12,13], and the hydrogen peroxide[14]. Per se, honey exhibits water solubility and can be readily rinsed away, even when applied to cavities such as cysts or stage IV lesions[9]. Medical honey dressings can be used alone or in combination with other medicines such as calcium alginate[15].

The fields of application of the medical honey are (i) chronic wounds ulcers, (ii) stoma-therapy, and (iii) burns. Regarding (i) chronic wounds ulcers, medical honey dressings are used to avoid the replication of bacteria and accelerate wound healing[7]. They prevent the formation of biofilm16 because the honey recall macrophages, which are responsible for the removal of devitalized and/or necrotic tissues from the wound bed[7,16,17]. In cases of wounds with moderate to heavy exudate, it may be necessary to utilize a secondary dressing to manage the infiltration of diluted honey from the primary dressing[9]. Furthermore, a recent meta-analysis revealed that the utilization of honey dressing on diabetic foot ulcers led to a significantly increased rate of wound healing (OR, 2.06; 95% CI, 1.45-2.93, $p<.001$) and lower wound healing time (MD, −10.42; 95% CI, −16.27-−4.58, $p<.001$)[18]. Finally, medical honey dressings reduce the average time needed for wound healing (Hedge's g: -0.81), patients' length of hospital stay (-3.1), and VAS score (-1.2) as compared with the povidone iodine-based dressings[19].

Regarding (ii) stoma-therapy, Manuka honey is used in association with hydrocolloid for the protection of the peristomal skin[20]. In detail, medical honey dressings have a double action that is to maintain healthy skin and healing damaged skin20. In fact, around 80% of people with stomas experience skin problems, and medical honey dressings can help in reduce inflammation, moisturizes the skin, and add a balance protection[21]. The implementation of measures to minimize skin damage in ostomy care has the potential to yield significant benefits in terms of reducing patient distress, minimizing product consumption, and optimizing nursing efficiency[20].

Regarding the use of honey on (iii) burns, it has been documented that honey dressings can hasten healing in superficial and intermediate partial thickness burns[22]. The empirical evidence demonstrates that honey possesses wound healing capabilities, which encompass the facilitation of tissue growth, promotion of epithelialization, and mitigation of scar formation. The aforementioned benefits can be attributed to various factors associated with honey, including its acidity, hydrogen peroxide concentration, osmotic action, nutritional and antioxidant contents, stimulation of immunity, as well as other undiscovered chemicals[23].

We can conclude that the future's challenge entails the exploration of novel resources are rooted in our historical past. In fact, as we said, the use of medical honey dressings offers numerous advantages in wound care and healing. Apart the

already noted antimicrobial properties, wound debridement, anti-inflammatory effects, moist wound healing, promotion of granulation tissue formation, minimization of scarring, autolytic debridement, and suitability for treating chronic wounds, medical honey dressings could provide other five important implications that at this stage are underdeveloped.

First, medical honey dressings could be an alternative care for individuals experiencing antibiotic resistance as a crucial area of concern in the field of healthcare. Second, honey dressings are relatively easy to apply, and they conform well to irregular wound shapes making them more suitable for various types of wounds. Third, while medical honey dressings might be more expensive than some traditional dressings initially, they can potentially reduce overall treatment costs by promoting faster healing and shorter hospital stays. Fourth, medical honey has a long shelf life, making it a practical option for wound care in various healthcare settings. Finally, medical honey dressings could be used even in countries with high financial constraints that hinder their ability to procure advanced wound dressings, because of the easier access to honey.

In conclusion, medical honey dressing proves to be a crucial and valuable treatment option, harnessing the remarkable therapeutic properties of honey. The promising results and potential benefits of medical honey dressing call for further comprehensive research and clinical studies. By delving deeper into its mechanisms of action, exploring its efficacy in diverse wound types, and investigating its long-term effects, future studies can unlock the full potential of medical honey dressing. Such research endeavors will not only advance our understanding of this remarkable treatment but also pave the way for its widespread adoption and integration into mainstream medical practices, ultimately improving patient care and outcomes.

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Research

# The "Psychology" of organ donation: two exploratory studies considering Italian "Health professionals" and "Citizens"

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**Abstract**

**Background:** Transplantation extends and improves lives, but the shortage of organs is one of the main factors limiting the number of transplants in Italy1. Objectives: The aim of this research was to understand the psychological and socio demographic determinants that can be related to the manifestation of the willingness to donate in a sample of citizens and professionals. Methods: In the study conducted on two samples (health professionals and citizens), two selfadministered questionnaires were created ad hoc and administered to the participants recruited by means of a snowballing not-randoming procedure. Results: 386 citizens and 122 health professionals completed the questionnaire. Results frequently supported the literature. Specifically, with reference to the sample of citizens, (a) women are more likely to express a willingness to donate than men; furthermore, (b) having a realistic knowledge of the topic has a relationship with this manifestation. In both samples, (c) having previously discussed the topic of donation is relevant to expressing willingness to donate. With reference to the sample of professionals only, (d) having received training on organ donation has a relationship with practitioners' willingness to donate. Conclusion: There are several factors that influence the manifestation of willingness to donate in both samples. Efforts should be stepped up to provide comprehensive and appropriate education, knowledge and training on the subject to increase willingness to donate.

**Key words:** Covid-19, Organ Donation, Psychosocial Factors, Ethnicity, Psychology

## Introduction

Organ donation is the act of giving one or more organs, without any monetary compensation, for transplantation to someone in need[1,2]. This process has various implications in the medical, legal, ethical, organizational, and social realms[3,4]. Unfortunately, there is a shortage of organs available for transplantation, whether from living or deceased donors[1,5]. Research on people's willingness to donate during their lifetime has shown that women tend to have more positive attitudes and intentions towards donation, although this does not necessarily translate into a higher actual donor rate[6]. However, studies on the relationship between gender and organ donation have yielded conflicting results[7,8]. For example, previous discussions with family members have been found to influence the expression of willingness to donate, with women more likely than men to have had such conversations[9,10]. Several studies have highlighted increased awareness and knowledge as important factors influencing donor registration status[8,11]. The impact of religion on organ donation has yielded conflicting results. Some studies suggest a reduction in registrations due to the misperception that organ donation is not supported by religion[12], while others find that religion has no impact[8,13]. If we focus on a more limited group, such as healthcare workers, with a particular emphasis on nurses who play a crucial role in this intricate process, it becomes apparent from the literature that they lack sufficient knowledge, especially regarding the concept of "brain death". It is necessary for intensive care nurses to acquire more skills and knowledge without any religious or cultural beliefs that hinder organ donation[14]. Hence, efforts should be intensified to provide comprehensive and appropriate scientific training to healthcare professionals to address this gap[15]. However, it is imperative to remember that scientific competence does not always correlate with a positive culture as it is influenced by individual ideas, personal beliefs, and group sentiments. This underscores the need for new training opportunities and models. Nurses who have participated in organ and tissue transplantation after a person has been declared brain dead often experience strong distress and display negative attitudes towards organ donation, which can influence others and impede efforts to increase consent for donation[14]. Additionally, a significant deficiency in emotional and professional education has been identified in preparing operating room nurses for organ procurement[16]. Based on the findings in the literature, we are striving to promote research aimed at profiling potential donors among the public and investigating the variables that influence and could foster better attitudes and less opposition among citizens and healthcare practitioners themselves.

## Main aims scope

as is well known, the complex process that determines the change and adoption of new behaviors, often related to the change of explicit attitudes, is described in psychology by the Readiness to Change Theory (RTC)[17]. The importance of this theory can be traced to the existence of at least five determinants for the adoption of a given attitude/behavior, namely: knowledge of the problem, perceived relevance of the problem, perceived social support toward change, confidence in the proposed solution, and perceived readiness to change (self-reported). The purpose of this research was to understand the determinants described in the RTC with reference to the manifestation of willingness to donate in a sample of citizens and professionals. In agreement with the literature, the following were supposed: (i) the gender of the respondents, as women are reported as more likely to manifest willingness to donate than men[7,8], (ii) in addition, a conservative hypothesis is maintained with reference to religion and no significant relationship is expected between professed religion and the manifestation of willingness to donate[8,13]; (iii) a good knowledge of the topic[8,11], and (iv) having had discussions in the past about organ and tissue donation[9,10] expected to have a significant relationship with the manifestation of willingness to donate. Finally, in reference to professionals, (v) a significant relationship is expected with having received training on organ donation with the professionals' manifestation of willingness to.

## Materials and methods

### *Study design*

The study was conducted as an online questionnaire, using a cross-sectional and correlational design. Data collection occurred

between April 20 and December 13, 2021, utilizing websites and establishing contacts with nursing, medical associations, and organizations focused on the subject of donation.

*Participants and sampling*

The participants were divided into two groups: practitioners and citizens. The sampling was not random and adopted a snowball sampling strategy. The only criteria for exclusion and inclusion in the study were being 18 years old or older and having a comprehension of the Italian language.

*Methods*

The completion time for the questionnaires was approximately 10 minutes. The questionnaires for citizens and practitioners were custom-designed, taking into account existing literature and expert input. Citizens were recruited by sharing the questionnaire link across various online platforms and social networks. Participants had the option to withdraw from the study at any time. The obtained results were kept anonymous. To enroll practitioners, six associations were contacted via email, accompanied by a cover letter requesting their cooperation in encouraging as many members as possible to participate in the study. The associations that agreed to collaborate were: ANIARTI, AICO, AIDO, AIIAO, SIAN, SIIET.

*Measures*

*4.1 Citizens' questionnaire*

In line with literature[8], the citizens questionnaire collected some preliminary data in a first section, including age, gender, marital status, family situation, nationality, region and province of residence, occupation, and religion practiced. Next, attitudes toward organ and tissue donation/ transplantation were analyzed. A third section[18] explored knowledge of organ and tissue donation/ transplantation. A fourth section[10] delved into discussions and past experiences. The last section of the questionnaire aimed to explore beliefs about the possibility of organ and tissue donation and the propensity to donate in relation to the Covid-19 pandemic (Appendix 1a).

*4.2 Practitioners' Questionnaire*

The first section of the questionnaire for practitioners gathered preliminary data such as age, gender, marital status, and family situation. The following section aimed to explore personal attitudes and experiences regarding organ and tissue donation and transplantation. The third section of the questionnaire focused on the professional training of practitioners in various aspects related to donation and transplantation, such as clinical, technical, procedural, ethical, legislative knowledge, as well as relational and communication skills necessary for supporting relatives during end-of-life situations and subsequent donation requests. The next section delved into professional experiences, while the final section aimed to assess the impact of COVID-19 on organ and tissue donation[14]. (Appendix 1b).

**Data Analysis**

The analysis of the collected data involved, in the first stage, conducting coding and preliminary recording procedures to define the variables being investigated. Additionally, we performed checks on the obtained data to ensure that the necessary preconditions for analysis were met, such as minimum subsample size and balancing. Descriptive statistics of the sociodemographic, psychological, and operational variables from both samples were then obtained. To test our hypotheses, we used relevant contingency tables and performed chi-square tests to identify relative frequencies and percentages. The data were analyzed using aggregated forms. Initially, descriptive statistics will be presented for each sample, followed by inferential statistics to determine which variables have a significant relationship with expressing a willingness to donate, in accordance with the hypotheses we formulated.

*Ethical considerations*

No ethical approval was needed according to local ethical committee (Tuscany Regional Ethical Committee) policy because no patient was involved in this study. The study protocol was drafted according to the Good Clinical Practice (GCP) and was conducted according to the principles of Helsinki Declarations. The researchers performed the study following the guidelines contained in the new national Privacy Body of Law (Italian laws numbers 196/2003 and 101/2018). All participants' data were collected and managed to maintain their anonymity.

**Results**

*Study 1 - Citizens*

*Descriptive statistics*

Sociodemographic data

The number of citizens' respondents who participated was 386, with a majority being females (79.8%, 308 out of 386). The average age of the sample was 29.49 (SD = 11.218). Furthermore, most of the respondents were single (71.5%, 276/386)

and had completed their graduate or higher degrees (58%, 224/386). In terms of occupation, a significant portion of the participants were students (52.8%, 204/386) or workers (33.2%, 128/386). Additionally, our survey revealed that almost half of the respondents identified as religious (48.7%, 188/386), with 84% of believers (158/188) stating that their religion supports religion (Table a.1).

***Knowledge***

87% of the sample (336/386) were aware of the possibility of donating both cadaver and living organs, and 78.5% (303/386) reported knowing which organs and tissues could be donated. However, when asked to specify what could be donated, only 11.4% (44/386) correctly selected all options. Specifically, 79% (305/386) correctly selected "heart, liver, and lungs," while only 17.9% (69/386) selected "pancreas and intestines". 87.8% (339/386) said they were familiar with the concept of brain death, but only 78.2% (302/386) correctly selected the definition: "The irreversible loss of brain activity, the ability to breathe, or maintain other vital functions independently" (Table a.1).

***Attitudes toward donation***

100% of respondents (386/386) said they were in favor of organ and tissue donation, and 72.3% (279/386) expressed their willingness to donate after death. Additionally, 94% (363/386) of citizens recognized the possibility of saving lives as a positive aspect. 46.1% saw donation as an act of solidarity, while 30.8% (119/386) viewed it as a chance to give meaning to the loss of a loved one. Finally, 51.8% (200/386) regarded donation as a civic and moral act. When asked about negative aspects, 79.3% (306/386) said they didn't see any negative aspects. However, among those who did, 7.8% identified maintaining the integrity of the body as a concern, and 7.3% (28/386) highlighted a lack of recognition of brain death as the death of the person (Table a.1).

***Discussions and experiences***

80.1% (309/386) said they have discussed donation in the past, mostly with parents (56%) and friends (57.8%). Only 22.5% (87/386), however, said they have had direct personal experiences regarding organ and tissue donation, and only 10.6% (41/386) have had experiences inherent in living donation. Additionally, 22 subjects (5.7%) were directly asked to consent to donation (Table a.1).

Of those who have been involved in donation, 42.5% reported a more positive attitude, while only one person (1.15%) reported a more negative attitude. Additionally, the 79.8% of the total sample said they would consent to the donation of a deceased family member should they be asked for consent. Finally, despite the current Covid-19 epidemiological emergency, 84.5% believe that it is possible to donate and 97.7% say they have not changed their propensity towards donation (Table a.1).

***Inferential statistics***

The results revealed that 60.3% of males expressed a willingness to donate compared to 75.3% of females. Females demonstrated a higher willingness to donate than males (75.3% vs 60.3%, $\chi 2=7.053$; $p< 0.01$).

There was a significant association between expressing a willingness to donate and knowledge of which organs and tissues can be donated (Table 1). Among those who reported knowledge of donation possibilities, 75.2% expressed a willingness to donate. The difference between those who knew that skin, bones, tendons, cartilage, and corneas can be donated and indicated willingness to donate, and those who knew but did not express a willingness to donate, was approximately 21%, with 83.3% indicating a willingness to donate (Table 1). Similar trends were observed for other dimensions as well (Table 1).

A positive attitude towards the process of donation, viewing it as a civic and moral act, was found to significantly increase the willingness to donate after death (Table 2). In a similar vein, individuals who did not experience any negative aspects of donation were also more likely to manifest their willingness to donate (Table 2). Conversely, a negative attitude towards donation, characterized by distrust in the healthcare system, lack of recognition of the concept of brain death, and concerns about disfigurement of body integrity, was found to be statistically significantly related to a lower willingness to donate. Specifically, among those who have not expressed a willingness to donate, 41.7% reported distrust in the healthcare system, 53.3% cited concerns about disfigurement of body integrity, and 57.1% did not recognize the concept of "brain death" (Table 2)

After discussing the topic of donation in previous research, it was found that there was a significant correlation between discussing the topic and the likelihood of expressing a willingness to donate. For instance, 86.6% of individuals who had

discussions about donation with their parents expressed a willingness to donate. Table 3 provides a breakdown of the different degrees of kinship of the individuals with whom the topic was discussed, highlighting the potential social support a person may have in the donation process. Additionally, there was a statistically significant relationship between expressing a willingness to donate and having personal experiences of family members or friends involved in the donation process. In fact, 81.6% of individuals who had prior personal experiences expressed a willingness to donate. On the other hand, there was no statistically significant relationship between being religious and expressing a willingness to donate (Table 3).

***Study 2 - Practitioners***

***Descriptive statistics***

Sociodemographic variables

The respondents who participated in the study were 122 practitioners. The sample consisted mainly of women (61.5%, 75/122). The average age of the participants was 41.13 years (SD= 11.43). In the sample, 34.4% (42/122) were single, and slightly more than half identified as religious (75.4%, 92/122), with the majority being Catholic (73%, 89/122). The majority of the participants were nurses (93.4%, 114/122), and most of them had a bachelor's degree (32.8%, 40/122) as their highest level of education, followed by practitioners with bachelor's degrees (31.1%, 38/122). Additionally, 18.9% (23/122) of the participants were nurse coordinators, 2.5% (3/122) were facility managers, and 94.3% (115/122) worked in a public healthcare institution.

***Attitudes toward donation***

Most practitioners supported donation, with 98.4% (120/122) in favor, and 77.9% (95) expressing a desire to donate after death. Furthermore, 61.5% (75/122) stated that organ and tissue donation and transplantation was not a duty specifically associated with being a health care worker. Additionally, 63.1% (77/122) rated donation as an extremely important process in the realm of healthcare (Table a.2).

***Social Dimension (Discussions and Experiences)***

As many as 95.1% (116/122) of the participants discussed the topic of organ and tissue donation in the past. The majority of these discussions were with parents (51.6%, 63/122) and friends (64.8%, 79/122). In terms of personal experiences, 35.2% (43/122) of the respondents and their families and friends had experiences related to organ and tissue donation. When it comes to experiences in the work environment, 60.7% of the participants had participated in a tissue/cornea donation pathway. Additionally, 51.6% (63/122) had taken part in a beating-heart donation pathway in the intensive care unit (ICU), and 28.7% (35/122) had taken part in a still-heart organ donation pathway in the ICU or emergency room. In the group of participants who took part in a donation pathway, 39.3% (48) were involved only in the clinical aspect, while only 2.5% (37122) were involved in the family relationship part. Interestingly, 44.3% (54/122) of the participants mentioned that there was no staff specifically trained in organ and tissue donation in their operating unit, while 35.2% (43/122) stated that there is staff trained in donation, but it consists solely of medical staff and nurses. When asked about the frequency of donation pathways, 28.7% (35/122) of the participants considered it to be a rare occurrence, while in 19.7% (24/122) of cases, donation was considered a frequent pathway.

***Perception of the donation process***

Referring to operators' perceptions of the donation process, 23.8% (29/122) of practitioners stated that they found the transition from the curative to the donative phase to be somewhat emotionally difficult. 23% of caregivers (28 caregivers who participated in a donation pathway) perceived the support relationship with family members to be quite emotionally difficult, and 28.7% (35/122) found the donation offer interview to be emotionally challenging. In general, 42.6% (52/122) of providers described the donation process as quite stressful, while 26.2% (32/122) considered it to be very stressful. Furthermore, 40.2% (49/122) believed that the family to whom the donation request was made rarely has time to process the death of their loved one, and 50% (61/122) of practitioners believed that the family rarely has time to manage their emotions. Finally, 45.1% (55/122) of respondents emphasized the significance of the support offered to families who have been asked to donate, considering it extremely important even after the conclusion of the hospital journey.

***Training***

In the sample of operators, 64.8% (797122) of practitioners received training on clinical, technical, and procedural aspects in reference to the organ and tissue donation pathway. Only 33.6% (41/122) had also received training on relational and communication methods useful

for supporting relatives during the end of life and the subsequent request for donation. Half of the practitioners (58.8%, 62/122) had also received training on ethical and legislative aspects of organ and tissue donation and transplantation, while 27.9% (34/122) said they had never received any kind of training. In reference to the usefulness of the training, 86 individuals who received it (70.5% of the total sample) said it was useful (Table a.2).

***Inferential statistics***

Having previously discussed the topic, it can be observed that there is a statistically significant relationship between discussing donation and expressing a willingness to donate (Table 4). For instance, 87.3% of individuals who had conversations about donation with their parents expressed a willingness to donate. Additionally, being involved in a donation pathway as a healthcare professional also showed a significant relationship with expressing a willingness to donate ($p< 0.01$). Among those who were involved in a donation pathway, both in the clinical setting and in their interactions with patients, 80.5% expressed a willingness to donate. Furthermore, it appears that expressing a willingness to donate is related to participating in a donation pathway during the Covid-19 pandemic period. It can be stated that 90% of those who participated in a donation pathway expressed their willingness to donate (Table 4).

Having participated in training on ethical and legislative aspects in reference to the donation process was significantly associated with expressing a willingness to donate ($p<0.05$); specifically, 85.5% of individuals who underwent the training expressed a willingness to donate (Table 5).

**Discussion and conclusion**

Organ and tissue donation is a medical procedure that has the potential to save and transform lives. The process holds personal significance, but also carries various implications[3,4]. Regrettably, many countries struggle to meet the demand for transplantable organs due to insufficient donors[12,19]. This study aimed to examine the sociodemographic and psychological factors influencing both pre-death and post-brain death organ and tissue donation. In line with existing literature[6], our study found a significant association between female gender and willingness to donate[7,8]. Furthermore, consistent with prior research[8,11,18], a notable relationship between knowledge of organ donation and the willingness to donate was observed. Indeed, having a greater understanding of the subject and the related concept of brain death are crucial factors in determining one's donor registration status. A significant portion of our sample (78.5% - 303/386) reported being knowledgeable about which organs and tissues can be donated, but only 18.4% of the participants knew that heart valves and blood vessels are also viable for donation. In terms of familiarity with the concept of "brain death," the majority of our sample (87.8%) indicated that they were familiar with this concept, and 78.2% correctly answered a question about the definition of "brain death". Regarding attitudes towards donation, our findings revealed a significant correlation between expressing a willingness to donate and recognizing "organ donation" as a civic and moral act. Additionally, not having mistrust towards the healthcare system and showing no fear of body disfigurement were also associated with a greater likelihood of expressing willingness to donate, aligning with previous research[5]. The relationship between religion and donation is reported differently in existing literature. In our sample of Italian citizens, 100% expressed support for donation, and approximately 50% identified as religious. However, religiosity did not appear to have an influence on the propensity to donate in any subgroup of our study. Another factor that has been documented as influential in willingness to donate is prior discussion about donation with family or relatives[9,10]. Discussions with family members are found to be crucial in influencing donor families' satisfaction with their decision to donate[20], and our study confirms this finding. In our study, health professionals who were involved in the donation process showed a significant positive relationship with their willingness to donate. Consistent with existing literature[14,15], our study also found that receiving adequate training to undertake the donation process is a relevant factor that affects the intention to donate among healthcare workers in our sample. Based on our data, a typical donor can be characterized as being female, having a positive opinion about donation, not placing importance on body integrity, having a positive level of trust in the healthcare system, possessing good knowledge about the topic, and engaging in discussions about it with others. Regarding the sample of healthcare workers, our findings highlight the importance of training and suggest that further studies should explore its impact on increasing the propensity to donate. From a psychological perspective, organ donation is perceived as a sudden event that disrupts the balance of individuals' lives[21]. It causes

significant stress and necessitates a shift in values and identity for those who are faced with making the "decision"[22]. The process of change and the adoption of new behaviors can be explained by the readiness to change theory (RTC) in psychology[17]. This theory holds importance due to the presence of at least five determinants for the adoption of a particular attitude or behavior. In the context of our study, these determinants are related to organ and tissue donation and include: (I) the individual's knowledge about organ and tissue donation, (II) their perception of the importance of the donation process, (III) their perception of support from significant individuals in their choice to donate, (IV) their confidence in the donation process while considering positive and negative factors, and (V) their belief in their ability to express their willingness to donate. These determinants help explain an individual's intention and subsequent display of willingness to donate. While some of these determinants can be addressed in the aforementioned study, further analysis is needed to explore others. However, we have also uncovered new insights that have not been extensively explored before, as well as contradictory findings that should be further investigated in future studies. Specifically, the variables that require further investigation are "caregiver involvement" in the donation process and receiving "specific training" on ethical and legislative aspects. These factors appeared to strongly influence the willingness to donate among healthcare workers. Moving forward, we hope to build upon these psychological findings and hypotheses, considering RTC to gain a more comprehensive understanding of organ and tissue donation. The ultimate goal is to encourage more individuals to express their willingness to donate through targeted interventions.

Table a.1: In the table the descriptive statistics of the data collected from citizens (for the dichotomous questions the frequencies of affirmative answers have been reported).

| Variable | Citizens *(n/%)* | | | |
|---|---|---|---|---|
| | ***Male*** | ***Female*** | $\chi_2$ | ***Whole*** |
| Numerosity | 78 (20.2%) | 308 (79.8%) | - | 386 (100%) |
| Religiosity | 29 (37.2) | 159 (51.6%) | 5.20* | 188 (48.7%) |
| Support of religion | 24 (82.76%) | 134 (84.28%) | ns | 158 (84%) |
| Being in favor of donation | 78 (100%) | 308 (100%) | ns | 386 (100%) |
| Manifestation of willingness to donate | 47 (60.3%) | 232 (75.3%) | 7.05** | 279 (72.3%) |
| **Positive aspects donation** | | | | |
| Opportunity to save lives | 75 (96.2%) | 288 (93.5%) | ns | 363 (94%) |
| Solidarity | 39 (50%) | 139 (45.1%) | ns | 178 (46.1%) |
| Lending meaning to loss | 26 (33.3%) | 93 (30.2%) | ns | 119 (30.8%) |
| Civic and moral act | 44 (56.4%) | 156 (50.6%) | ns | 200 (51.8%) |
| **Negative aspects donation** | | | | |
| None | 64 (82.1%) | 242 (78.6%) | ns | 306 (79.3%) |
| Distrust of the health care system | 5 (6.4%) | 31 (10.1%) | ns | 36 (9.3%) |
| Religious reasons | 1 (1.3%) | 3 (1%) | ns | 4 (1%) |
| Ethical/cultural reasons | 1 (1.3%) | 5 (1.6%) | ns | 6 (1.6%) |
| Maintenance of body integrity | 6 (7.7%) | 24 (7.8%) | ns | 30 (7.8%) |
| Failure to recognize brain death | 4 (5.1%) | 24 (7.8%) | ns | 28 (7.3%) |
| **Knowledge of organs and tissues for donation** | | | | |
| Perception of knowing what can be donated | 53 (67.9%) | 250 (81.2%) | 6.44** | 303 (78.5%) |
| Skin, bones, tendons, cartilage, corneas | 20 (25.5%) | 160 (51.9%) | 17.31*** | 180 (46.6%) |
| Heart, liver, kidneys, lungs | 55 (70.5%) | 250 (81.2%) | 4.26* | 305 (79%) |
| Heart valves and blood vessels | 11 (14.1%) | 60 (19.5%) | ns | 71 (18.4%) |
| Pancreas and intestines | 10 (12.8%) | 59 (19.2%) | ns | 69 (17.9%) |
| **Clarity concept brain death** | | | | |
| Perceived clarity* | 63 (80.8%) | 276 (89.6%) | 4.55* | 339 (87.4%) |
| Correct answer/verified knowledge* | 60 (76.9%) | 242 (78.6%) | ns | 302 (78.2%) |
| **Social comparison about donation** | | | | |
| Have you ever discussed with other | 57 (73.1%) | 252 (81.8%) | ns | 309 (80.1%) |
| Parents | 30 (38.5%) | 186 (60.4%) | 12.14*** | 216 (56%) |
| Siblings/sisters | 23 (29.5%) | 92 (29.9%) | ns | 115 (29.8%) |
| Friends | 44 (56.4%) | 179 (58.1%) | ns | 223 (57.8%) |
| Partners | 15 (19.2%) | 96 (31.2%) | 4.33* | 111 (28.8%) |
| Relatives | 5 (6.4%) | 37 (12%) | ns | 42 (10.9%) |
| Colleagues | 10 (12.8%) | 37 (12%) | ns | 47 (12.2%) |
| Family physician | 3 (3.8%) | 9 (2.9%) | ns | 12 (3.1%) |
| **Previous experience with organ donation** | | | | |
| Personal experience with donation | 20 (25.6%) | 67 (21.8%) | ns | 87 (22.5%) |
| Requested direct consent of donation | 4 (5.1%) | 18 (5.8%) | ns | 22 (5.7%) |
| **Covid-19** | | | | |
| Possibility to donate even during the pandemic | 68 (87.2%) | 258 (83.8%) | ns | 326 (84.5%) |
| Change in propensity toward donation | 1 (1.3%) | 8 (2.6%) | ns | 9 (2.3%) |

Table a.2: In the table the descriptive statistics of the data collected from professionals (for the dichotomous questions the frequencies of affirmative answers have been reported).

| Variable | Professional *(n/%)* | | | |
|---|---|---|---|---|
| | ***Male*** | ***Female*** | ***$\chi_2$*** | ***Whole*** |
| Numerosity | 47 (38.5%) | 75 (61.5%) | - | 122 (100%) |
| Religiosity | 34 (22.3%) | 58 (77.3%) | ns | 92 (75.4%) |
| Being in favor of donation | 46(97.9%) | 74 (98.7%) | ns | 120 (98.4%) |
| Manifestation of willingness to donate | 33 (70.2%) | 62 (82.7%) | ns | 95 (77.%) |
| **Social comparison about donation** | | | | |
| Have you ever discussed with other | 46 (97.9.%) | 70 (93.3%) | ns | 116 (95.1%) |
| Parents | 25 (53.2%) | 38 (50.7%) | ns | 63 (51.6%) |
| Siblings/sisters | 17 (36.2%) | 30 (40%) | ns | 47 (38.5%) |
| Friends | 29 (61.7%) | 50 (66.7%) | ns | 79 (64.8%) |
| Partners | 30 (63.8%) | 35 (46.7%) | 3.42* | 65 (53.3%) |
| Relatives | 12 (25.5%) | 12 (16%) | ns | 24 (19.7%) |
| Colleagues | 29 (61.7%) | 48 (64%) | ns | 77 (63.1%) |
| Family physician | 5(10.6%) | 3(4%) | ns | 8 (6.6%) |
| **Previous experience with organ donation** | | | | |
| Personal experience with donation | 17 (36.2%) | 26 (34.7%) | ns | 43 (35.2%) |
| Requested direct consent of donation | 1(2.1%) | 4 (5.3%) | ns | 5 (4.1%) |
| **Training connected with organ donation** | | | | |
| Clinical, technical and procedural aspects | 30 (63.8.%) | 49 (65.3%) | ns | 79 (64.8%) |
| Useful relational and communicative methods | 17 (36.2%) | 24 (32%) | ns | 41 (33.6%) |
| Ethical and legislative aspects | 27 (57.4%) | 35 (46.7%) | ns | 62 (58.8%) |
| None of these | 14 (29.8%) | 20 (26.7%) | ns | 34 (27.9%) |
| **Training experiences and motivation** | | | | |
| If it did, was it helpful?(Yes) | 31 (66%) | 55 (73.3%) | ns | 86 (70.5%) |
| If he didn't, he's interested in doing it (Y) | 21(95.5%) | 31 (96.9%) | ns | 52 (33.6%) |

Table 1 – Contingency table and chi-square between knowledge and having expressed willingness to donate

| Variable | Level | you have expressed your willingness to donate after death | | $\chi^2$ |
|---|---|---|---|---|
| | | Yes | No | |
| Know what organs and tissues can be donated | Yes | 228(75,2%) | 75 (24,8%) | 6,194* |
| | No | 51 (61,4%) | 32 (38,6%) | |
| Skin, bones, tendons, cartilage and corneas | Yes | 150 (83,3%) | 30 (16,7%) | 20,568*** |
| | No | 129 (62,6%) | 77(37,4%) | |
| Heart, liver and lungs | Yes | 229 (75,1%) | 76(24,9%) | 5,696* |
| | No | 50 (61,7%) | 31 (38,3%) | |
| Heart valves and blood vessels | Yes | 58 (81,7%) | 13 (18,3%) | 3,845* |
| | No | 221 (70,2%) | 94 (29,8%) | |
| Perceived/Self reported Knowledge of the concept of brain death | Yes | 255 (75,2%) | 84 (24,8%) | 12,023** |
| | No | 24 (51,1%) | 23 (48,9) | |

*: p. < 0.05; **: p. < 0.01; ***: p. < 0.001;

Table2 – Contingency table and chi-square between positive and negative aspects recognized in the donation and having expressed willingness to donate in citizens

| **Variable** | **Level** | **you have expressed your willingness to donate after death** | | $\chi^2$ |
|---|---|---|---|---|
| | | **Yes** | **No** | |
| Donation civic and moral act | Yes | 160(80%) | 40(20%) | 12,347*** |
| | No | 119(64%) | 67(36%) | |
| No negative aspects | Yes | 237(77,5%) | 69(22,5%) | 19,705*** |
| | No | 42 (52,5%) | 38 (47,5%) | |
| Health system distrust | Yes | 21(58,3%) | 15(41,7%) | 3,854* |
| | No | 258(73,7%) | 92(26,3%) | |
| Maintaining body integrity | Yes | 14(46,7%) | 16(53,3%) | 10,651*** |
| | No | 265 (74,4%) | 91(25,6%) | |
| Failure to recognize the concept of brain death | Yes | 12(42,9%) | 16(57,1%) | 13,044*** |
| | No | 267 (74,6 %) | 91 (25,4%) | |

*: p. < 0.05; **: p. < 0.01; ***: p. < 0.001;

Tab. 3 - Contingency table and chi-square between discussions, past experience and having expressed willingness to donate

| Variable | Level | you have expressed your willingness to donate after death | | $\chi^2$ |
|---|---|---|---|---|
| | | Yes | No | |
| Discussions had in the past | Yes | 246 (79,6%) | 63(20,4%) | 41,559*** |
| | No | 33(42,9%) | 44(57,1%) | |
| Discussions with parents | Yes | 187 (86,6%) | 29 (13,4%) | 50,015*** |
| | No | 92 (54,1%) | 78 (45,9%) | |
| Discussions with brothers/sisters | Yes | 108 (93,9%) | 7 (6,1%) | 38,260*** |
| | No | 171 (63,1%) | 100 (36,9%) | |
| Discussions with friends | Yes | 180 (80,7%) | 43 (19,3%) | 18,765*** |
| | No | 99 (60,7%) | 64 (39,3%) | |
| Discussions with partner | Yes | 99 (89,2%) | 12 (10,8%) | 22,234*** |
| | No | 180 (65,5%) | 95 (34,5%) | |
| Discussions with colleagues | Yes | 44 (93,6%) | 3 (6,4%) | 12,160*** |
| | No | 235 (69,3%) | 104 (30,7%) | |
| Prior personal experience | Yes | 71 (81,6%) | 16 (18,4%) | 4,879* |
| | No | 208 (69,6%) | 91 (30,4%) | |

*: p. < 0.05; **: p. < 0.01; ***: p. < 0.001;

Tab. 4 - Contingency table and chi-square between discussions, past experience, and having expressed willingness to donate in practitioners

| Variable | Level | you have expressed your willingness to donate after death | | $\chi^2$ |
|---|---|---|---|---|
| | | Yes | No | |
| Discussions with parents | Yes | 55(87,3%) | 8(12,7%) | 6,726** |
| | No | 40(67,8%) | 19(32,2%) | |
| Discussions with brothers/sisters | Yes | 41(87,2%) | 6 (12,8%) | 3,891* |
| | No | 54(72,0%) | 21 (28,0%) | |
| Involvement in a pathway to donation | Yes | 70(80,46%) | 17 (19,54%) | 12,862** |
| | No | 7(53,85%) | 6 (46,15%) | |
| Donation pathway during Covid-19 | Yes | 26 (90%) | 4 (10%) | 5,082* |
| | No | 59 (72%) | 23 (28%) | |

*: p. < 0.05; **: p. < 0.01; ***: p. < 0.001;

Tab.5 - Contingency table and chi-square between training, involvement in the pathway, impact of the pandemic, and has expressed willingness to donate in providers

| Variable | Level | you have expressed your willingness to donate after death | | $\chi^2$ |
|---|---|---|---|---|
| | | Yes | No | |
| Training of ethical and legislative aspects | Yes | 53(85,5%) | 9(14,5%) | 4,242* |
| | No | 42(70%) | 18(30%) | |

*: p. < 0.05; **: p. < 0.01; ***: p. < 0.001;

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# IL PRIMO PASSO PER LA RIABILITAZIONE È ALLA "DON GNOCCHI"

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Review

# Peristomal skin changes: therapeutic education on prevention and nursing interventions on management

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**Abstract**

**Introduction**: for the person with an ostomy it is very important to have intact peristomal skin, because there is a certainty that the ostomy pouching system adheres to the skin; on the other hand, with altered skin there is a greater risk that the ostomy pouching system detaches with consequent infiltration of the effluents and contact with the peristomal skin, showing skin alterations and further compromising the person's quality of life.

**Materials and methods**: the bibliographic research conducted on PubMed detecting 47 publications that answered to the 2 research questions, under 10 years, with a sample of more than 50 adult participants and in English language.

**Results:** to define therapeutic education strategies to prevent peristomal skin complications and the most appropriate nursing interventions and dressing to manage peristomal skin complications.

**Conclusion:** a preventive therapeutic education with detailed, simple, adequate information and perhaps supported by printed information leaflets regarding peristomal skin complications will be able to reduce the incidence of peristomal skin changes, because the person with an ostomy will be able to recognize early the signs and symptoms of altered skin and manage them at home, thanks to the guidelines provided by the specialist nurse. In addition, the specialist nurse can effectively put to good use the expertise acquired through the treatment of peristomal skin complications, preventing the patient from suffering further side effects and speeding up the healing process, which is the main goal.

**Key words:** Wound Care, Wound Management, Peristomal Skin Complications, Education, Nursing interventions, Dressing

## Introduction

The stomated person is a person who, following surgery that led to the packaging of an ostomy, suffers both physical and psychological injury, leading to a change in their body image.

The person with a stoma may experience early or late complications depending on the time of onset. Complications negatively affect their quality of life. Preventive therapeutic education is fundamental to maintaining skin integrity: an essential and of the utmost importance requirement to proceed with the correct management, application and use of the stomal device, moreover, the acceptance of one's stoma will also depend a lot on this factor that will allow the resumption of normality[1].

Altered skin prevents the ability of the collection garrison to adhere, causing early detachment resulting in loss of fecal or urinary material, which damages the skin and, if left untreated, can develop into more serious problems[1,2,3].

The alteration of the peristomal skin results in a marked deterioration in the quality of life and autonomy in the person with stoma[4,5]. It undermines the person's ability to adapt to the new living condition and the management of the stoma will be more difficult. This prevents the resumption of work activity and social life because the person will have the fear and anxiety that the event of plaque detachment, with consequent loss of effluents, will occur without warning and especially in unsuitable areas, causing embarrassment, isolation, up to depression, with consequent increase in health costs for the management of the stoma[4,5,6].

This is why the stoma therapist has a very important role in educating the person or caregiver to the stoma care to maintain the integrity of the peristomal skin, which will have to become the primary goal for the stomated person. Prevention is better than cure: skin changes are often underestimated or there is little specific information about this problem, so it will be essential to provide information in order to gain greater awareness in recognizing the signs and symptoms of peristomal skin changes (such as skin color, skin integrity, shape, distribution and size of irritation or maceration, pain or burning[7]) in order to better manage them and prevent more serious complications[6, 8, 9, 10].

In fact, in a study investigating the perception of people with a stoma about the information that is provided at the time of discharge, 83% show that they would have liked more information about skin care, what peristomal skin changes are and how to treat them[11].

In addition, two studies show that 80% of people with stoma do not seek health care, as they cannot perceive the presence of a skin alteration around the stoma; this data therefore suggests the need for a better education and training on peristomal skin alterations[2, 7].

The highest incidence of skin changes shows in people with an ileostomy, also due to the damaging nature of the feces emitted, and they exhibit a significantly reduced quality of life[4,6,7].

The goal of this literature review is to define what are the educational strategies to prevent peristomal skin alterations, since preventive education is an essential strategy, and to bring out management nursing interventions, with any dressings. This research objective was due to the lack of evidence literature on wound care applied to stomaterapy, in fact between the master in stoma therapy and wound care there is a combination between them that allows you to manage the peristomal skin in the best way, given the importance of skin integrity with the consequent application of the collection system. I would also like to bring out the new scientific evidence to treat peristomal skin in correspondence with the new reform on professional responsibility Law 24/2017 'Provisions on the safety of care and the assisted person, as well as on the professional responsibility of the professionals of the health professions', which tells us that the nurse must comply with the guidelines and clinical-care practices in the exercise of his activity.

## Methods

To carry out the literature review, the main research questions were as follows:

> What are the most appropriate nursing interventions/medicines to manage peristomal skin changes?

Following is the formulation of the two PICOs:

**POPULATION:** stomaly patient
**PROBLEM:** skin changes
**INTERVENTIONS:** prevention strategies
**COMPARISON:** is not present
**OUTCAME:** management of skin changes.

**POPULATION:** stomaly patient
**PROBLEM:** skin changes
**INTERVENTIONS:** nursing interventions/medicines
**COMPARISON:** is not present
**OUTCAME:** management of skin changes.

The keywords used for the research are the following: medication, peristomal skin, ostomy, skin care peristomal, wound care, hydrocolloid dressing, wound management, treatment, alginate dressing, complication, hydrofibre dressing, chemical contamination dermatitis, allergic contact dermatitis, irritation, periwound skin, maceration, contamination dermatitis, prevention, skin diseases, skin changes, care, nursing, irritation, strategies, contact irritant dermatitis, dermatitis peristomal.

The search strings were built with the Bolean operator AND. The source of information was the PubMed database, research conducted from January 15, 2020 to September 30, 2020. The reviewed articles were selected according to these eligibility criteria: if they answered the 2 research questions, articles of 10 years (therefore from 2010), with a sample of more than 50 adult participants (excluding samples with children) and English language.

## Results

the selection of the studies was made according to this flowchart below:

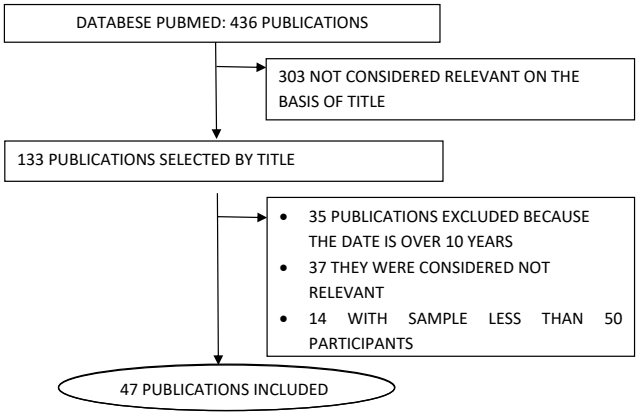



Figure 1.

The peristomal skin is that portion of skin that extends for about 10 cm around the stoma; it is a very important area, because the plaque of the collection system is adhered, for this reason it is essential to keep the skin rosy, dry, clean, intact, it must look like the skin on the opposite side of the abdomen without a stoma. Healthy peristomal skin without alterations is defined as the complete absence of any visible skin change in the peristomal area[12,13,14].

Risk factors for developing skin changes are: type and location of the stoma, effluent leaks, retraction, prolapse, mucocutaneous dehiscence, post-operative presence of hernia, body mass index (obesity BMI>40), chronic inflammatory bowel diseases (Crohn's disease or ulcerative colitis), complications of the laparotomic wound, emergency surgery, sex and age.

Peristomal skin changes are classified mainly on an etiological basis:

- chemical damage: contamination dermatitis, pseudo verrucous lesions, alkaline encrustations;
- mechanical damage: pressure ulcers, rubbing injuries, tear injuries, mucocutaneous separation;
- infectious: candida and folliculitis;
- immunological: allergic contact dermatitis;
- disease-related dermatitis: varicose veins, gangrenous pyoderma, malignancy;
- underlying skin diseases such as psoriasis and eczema[1,3,9,13,15].

Skin complications occur in patients with stoma between 6% and 80% depending on the type of ostomy and occur within 2-3 weeks of surgery[1,3].

It is essential that people with ostomy have intact skin to prevent leakage and avoid discomfort[12],

but after surgery, the most common physical complication experienced by 77% of people is skin alteration, caused by plaques that do not fit the skin resulting in loss of effluents[2,14], affecting 1/3 of colostomies and more than 2/3 of urostomies and ileostomies[14]. In fact, skin changes vary according to the type of stoma: 48% in urostomies, 29% to 31% in colostomies and 5% to 70% in ileostomies. 42% of stomated people have dermatitis on chemical damage, the most common diagnosed ailments are erosion (33% of cases), maceration (20%) and erythema (16%)[9].

In addition, the literature shows that peristomal skin complications develop in 27 out of 43 people after 21 - 40 days after the creation of the ostomy: 11 had infection (fungi or folliculitis); 8 skin erosions (excoriated, wet and bleeding skin), 7 erythema. 9 subjects developed more than one skin complication[16].

After one month after surgery ¼ of people present irritation, 40% after 5 months present a painful or irritated peristomal skin, 33% after 12 months and 20% after 24 months; 76% of these people had problems for more than three months; in 62% it was caused by the leakage of feces or urine that came into contact with the skin (the cause was the hole too large), causing contact irritative dermatitis; in 20% they had mechanical lesions (potentially affected colostomies); 9% infections; it was found that more than half of ileostomies and urostomies and 1/3 Of colostomies had skin complications[12].

A retrospective study shows that in 168 people with ostomy the mean time elapsed from ostomy surgery to the first appearance of skin alteration was 23.7 ± 20.5 days, for colostomy 23.2 ± 20.8 days, for ileostomy 24.2 ± 21.1 days and for urostomy 22.0 ± 0.0 days. The incidence of peristomal skin changes over 1 year was higher for ileostomy (57%), followed by urostomy (48%) and colostomy (35%)[6].

Most complications happen within the first 2 weeks after hospital discharge, mostly in ileostomies (60%). Excoriated skin is reported in 20% of ileal ducts, 29% of colostomies and 70% of ileostomies. The overall rates of skin problems were 25% (0-2 weeks), 40% (3-6 weeks), 20% (7-12 weeks and 3-6 months) and 15% (6-12 months)[7].

In conclusion, from the review of the literature it is clear that the highest rate of early peristomal skin changes is chemical contamination dermatitis[1,13], up to 40% of people report an irritated peristomal skin, with prevalence rates between 25-59%[5], in 62% of people following the infiltration of effluents on the skin, caused by the cutting of the plaque too large, it presents with erosion in 26% of cases[3,10,15], or in another study 14 subjects with skin irritation associated with moisture and caused pain, itching and redness[16].

In addition, allergic contact dermatitis is another very represented alteration[17].

The literature evidences that the people most at risk are the elderly, because of their skin thinning; the skin alteration that manifests itself most is the mechanical damage from stripping, manifesting skin tears (skin tears) that the ISTAP (the International Skin Tear The Advisory Panel) has classified their severity into 3 types: type 1 linear losses of skin flaps without loss of skin that can be repositioned so as to cover the wound bed, type 2 is characterized by partial loss of the skin so that the residual flap does not cover the entire base of the wound when Repositioned, type 3 total loss of the skin flap[18].

The type of stoma most at risk of developing skin changes is ilostomy equal to 78% in the first 10 postoperative days and 20% of patients with ileostomy complain of skin excoriations[15,16].

A descriptive study analyses quality of life with skin complications, most turned to an enterotomist (33, 47.8%), but others did not seek help with their complications (24, 16.3%). People who sought help were generally satisfied with the help received (average satisfaction score 77.94 ± 24.71). Allergic contact dermatitis was the most reported peristomal complication. Irritating contact dermatitis negatively affected QdL and nearly half of the participants sought help from an enterostomist. The results of this study suggest that patients may benefit from increased education on peristomal complications and reporting of collection system-related skin changes[19].

A prospective research project describes that, out of a sample of 89 patients, peristomal skin complications are 10% to 70%, of which 31 patients had chemical damage to the peristomal skin (irritating dermatitis), 5 mechanical lesions, 4 Candida infections, 1 allergic reaction and 1 gangrenous pyoderma[20].

So the stoma therapist must adopt planning strategies (critical component in the management of a patient undergoing surgery that requires the packaging of an ostomy) to prevent peristomal skin alterations, which are:

✓ the pre-operative design, to prevent

mispositioning;

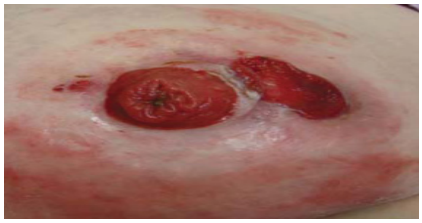
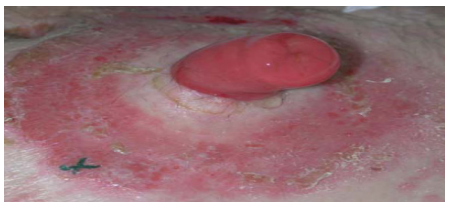
- ✓ the correct stoma care;
- ✓ therapeutic education (which should coincide with the pre-operative design[21]): to gain greater awareness of the importance of intact skin, which allows the correct management, application and use of the collection device and to recognize the signs and symptoms of peristomal skin alterations in order to better manage them and prevent more serious complications. Healthcare professionals have many classification systems that allow the evaluation and management of peristomal lesions:
- ✓ the Ostomy Skin Tool, through the DET[22,23,24,25] score;
- ✓ the classification system defined as S.A.C.S. (Peristomal Skin Disorders Study)[23];
- ✓ PWAT (Bates-Jensen Wound Assessment Tool), a tool previously used for pressure injuries, today the literature states its use is also to document peristomal skin problems through photography and thus be able to monitor their evolution[26];
- ✓ PLS (Peristomal lesion scale) new validated tool for peristomal skin assessment, focusing on patient demographics, clinical characteristics and classification of lesions by severity and topography. Created by AIOSS, AISLEC and the University of Padua, which introduces a new way of correctly interpreting and monitoring peristomal skin alterations, also reliable able to improve the quality of care and care of the stomata[27].

A literature review, to help health professionals in the management of skin changes, proposes the MINDS mnemonic model, which means: M- skin damage and mechanical skin stripping, Iinfection (bacterial or fungal), N- harmful chemicals and irritants such as feces or urine, D- skin diseases that are common in people with stoma, such as gangrenous pyoderma, psoriasis, S-skin allergens[28].

On the other hand, for the prevention and home care of peristomal skin changes in people with ostomy, in the international literature, it is clear that little information is given to the person about the importance of skin integrity and little information material that can support therapeutic education in the prevention of skin changes. Hence the importance of specialist health care by personnel with adequate knowledge and expertise in the field, as prevention, early identification and appropriate treatment of peristomal skin are essential for the care of the person with ostomy[29].

## Discussion

| SKIN PROBLEMS | EDUCATIONAL PREVENTION STRATEGIES |
|---|---|
| IRRITATIVE CONTACT DERMATITIS<br><br>(CHEMICAL DERMATITIS FROM CONTAMINATION) | - Use of plaques and barrier systems that are in close contact with the mucosa of the stoma in order to avoid as much as possible the contact of the enteric material with the adjacent skin, often provide a continuous adjustment due to the modification of the skin and abdominal wall in the post-operative course.<br><br>-Wider plaques may be needed in cases of high-flow ostomy[29]. |
| MECHANICAL TRAUMA DERMATITIS (STRIPPING) | - Use of protective wipes or sprays (barrier film) before applying the bag[12].<br><br>-Use of silicone base adhesive remover wipes that help loosen the skin from the adhesive[14, 28,29] |
| INFECTIOUS DERMATITIS: FOLLICULITIS | -Correct cleaning of the peristomal skin before applying plaque, even with the use of an antibacterial soap.<br><br>-Shaving the hair with an electric shaver or cut with scissors. Chemical hair removal with creams can be an alternative, but you need to be careful of skin irritation and allergic reactions[28, 30.] |
| INFECTIOUS DERMATITIS:<br><br>FUNGAL RASH /CANDIDIASIS | -Clean the peristomal skin with mild soap or possibly use antifungal solutions in selected cases, do not use antibacterials.<br><br>-Dry very well by dabbing.<br><br>-Apply powder that dries the skin[1,3,29]. |
| ALLERGIC CONTACT DERMATITIS | Use of a collection system and/or alternative products with different chemical properties[1,3,10,29,30,47]. |
| MACERATION | Correct modeling of the plaque on the ostomy to avoid contact of the fluid with the skin[29]. |
| DEPOSITION OF URIC ACID CRYSTALS (urostomies) | -Removal with acetic acid solutions, applying light pressure during cleaning[29].<br><br>-Use of convex plaque[28,31].<br><br>-Sizing of the plate hole[28]. |
| • USEFUL IN THE PREVENTION OF PERISTOMAL COMPLICATIONS IS THE USE OF ALOE VERA[32]. | |

| SKIN PROBLEMS | NURSING INTERVENTIONS FOR MANAGEMENT |
|---|---|
| IRRITATIVE CONTACT DERMATITIS<br>(CHEMICAL DERMATITIS FROM CONTAMINATION)<br>  | - Protective powder based on pectin or sucralfate applied to the erythematous skin at each change of bag, which absorbs the exudate and promotes the adhesion of the plaque[29].<br>-Protective films made of acrylate or silicone acting as a barrier[12,28,33,47].<br>-Hydrocolloid plaque with hydrocolloid ring around the stoma that promotes wound healing and absorbs moisture from the stool or urine thus ensuring the adhesion of the plaque[7,28,47].<br>-The scaling of the plate hole of the collection system by detecting with the meter the right size and, possibly, the use of the convex plate if the stoma is retracted[7,12,47].<br>-If skin folds are present, they can be filled with paste that levels the skin under the plaque so that there is no stagnation of the effluent[9,10,12,28,30,47].<br>-Moldable plaques that act as an excellent skin barrier with the aim of ensuring a secure seal around the everted stoma[2,34].<br>-The use of plates composed with Manuka35 honey.<br>-In cases of severe skin irritation, the application of steroids in spray to reduce the inflammatory process[7,28,30].<br>-Possible use of zinc oxide powder that is insoluble to water[28].<br>-For management, irrigation of the colostomy[47] can be considered as an alternative. |
| MECHANICAL TRAUMA DERMATITIS (STRIPPING)<br><br>IF SKIN TEARS OCCUR | -2-piece system so that the plaque remains in place for 2-3 days and skin damage is avoided (in fact, 61% of the stomatized to avoid this problem use the 2 pieces compared to the one-piece).<br>-Hydrocolloid powder to absorb exudate.[29]<br>-Low adhesion dressing to be renewed every day (such as dressings with hyaluronic acid) or non-adhesive dressings on a silicone basis to be renewed every 7 days, in order to protect the skin flap from the hydrocolloid plaque which is high adhesive, after cleansing with NaCl 0.9% saline solution.<br>-Using adhesive remover spray to remove plaque.<br>-Remove the flap only if not viable, otherwise always conservative method by repositioning the flap (possible use of steri-strip)[18,36]. |
| INFECTIOUS DERMATITIS: FOLLICULITIS<br>  | -Application of ionized silver-based protective powder that absorbs moisture.<br>-The topical use of alcohol-based clindamycin antibiotic. Systemic antibiotic therapy based on first-generation cephalosporins or cloxacillin may also be used[3].<br>-If exuding calcium alginate dressings with silver[28]. |
| INFECTIOUS DERMATITIS:<br>FUNGAL RASH /CANDIDIASIS<br>  | Possible both topical and systemic antibiotic therapy with topical fluconazole, nesstina or imidazole in powder form[1,3,28,29]. |
| ALLERGIC CONTACT DERMATITIS<br>  | -Possible Patch Test using the product in other parts of the body with 24-hour control, after 48 hours, after 72 hours[1,3,10,28,29,30,47].<br>- Topical or systemic use of cortisone products[31]. |

| | |
|---|---|
| PSEUDOVERRUCOUS LESIONS<br>  | -Evaluate the size of the plate hole.<br>-Recent onset: application of silver nitrate and finishing of the plate-bag system.<br>-Present for a long time, therefore hard and dry lesions, surgical removal is required.<br>-Check urinary PH to assess urinary acidity[30,31.] |
| CAPUT MEDUSAE-RELATED BLEEDING (related to cirrhotic patients) | -Attention during plate or bag replacement maneuvers.<br>-If rupture of a vessel manual compression to stop bleeding, if it should continue to apply bag of ice or silver nitrate[29]. |
| PAIN DUE TO PYODERMA GANGRENOSUM<br>  | - Cleansing with physiological solution or surfactant solutions. -Try topically steroid ointments/powders and ostomy absorbent powder[28].<br>-On P.M. systemic cortisone therapy, associated with topical therapy[28, 37].<br>-Use of hydrofibre or calcium alginates depending on the amount of exudate to be absorbed[37].<br>-A 1mg oral prednisolone tablet crushed and mixed with protective ostomy powder, apply it topically at each plaque change, covered with a primary dressing such as hydrofibre or alginate and fixed with a secondary hydrocolloid dressing, where the system plaque will then be adhered; this results in pain relief and wound healing[38,39].<br>-Avoid the debridement of the wound because it can cause further trauma with aggravation of the injuries[31].<br>-The collection device, which will be changed frequently, will need to be applied above the dressing[31].<br>-Convex plaques should be used very carefully to avoid even the slightest trauma to the skin[31].<br>-Possible antibiotic therapy on P.M.[31].<br>- Anti-inflammatory drugs, such as silver sulfadiazine[28]. |
| EXCORIATION/EROSION/ SKIN MACERATION | Alginates [40] . |
| PRESSURE INJURIES | -If exudates can be medicated with alginates or hydrofibre covered with a non-adherent or hydrocolloid polyurethane foam.<br>-If bottom to be debrided use of hydrofibre or collagenase as a primary dressing, adding a secondary dressing as a hydrocolloid.<br>-1-stage surface lesions with barrier powder and polyurethane or hydrocolloid foam[30]. |
| GRANULOMA | -Silver nitrate fillings, treatment once a week for 4 weeks[47] |
| | |
| PEG PERISTOMAL SKIN INFECTION | - Glycerin hydrogel (GHG) possessing antimicrobial properties changed every day to coincide with the dressing for 30 days[41]. |
| PEG CONTAMINATION BY GASTROENTERY JUICES | -Cleansing of the skin with dabbing water.<br>-Useful compresses with antacid solutions commonly taken by mouth in order to decrease gastric acidity[31] . |
| • THERE IS NO RECOMMENDATION FOR THE USE OF EOSIN[29]<br>• COMPARING THE EFFECT OF CHAMOMILE WITH THE USE OF TOPICAL HYDROCORTISONE CREAMS, CHAMOMILE APPLIED 2 TIMES A DAY, REDUCES PAIN, SKIN ITCHING AND INFLAMMATION (Additional randomized trials are required to refine the timing of topical application without interfering with the adhesion of the appliance or frequent removal of it)[42].<br>• USE OF THE NON-STEROIDAL IMMUNOSUPPRESSANT OINTMENT TACROLIMUS 1% MAY OFFER A MORE FAVOURABLE ALTERNATIVE TO TOPICAL STEROIDS[43]. | |

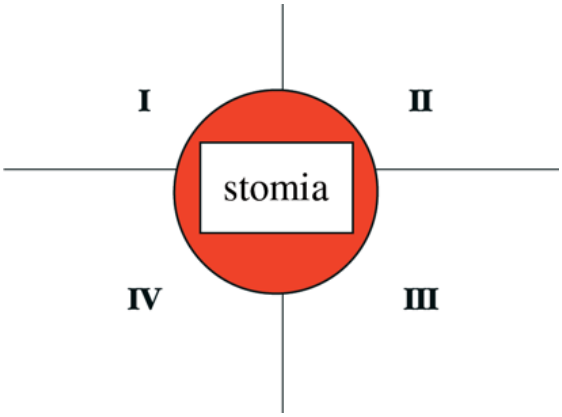
Taking into account the classification of S.A.C.S. stoma skin changes: L1 hyperemic lesion, L2 erosive lesion, L3 ulcerative lesion beyond the dermis, L 4 fibrinous/necrotic ulcerative lesion, LX proliferative lesion, the following dressings can be performed:

- LX or L4 apply debridement dressings such as hydrofibre or collagenase, with the application of hydrocolloid plaque on top;
- L3 or L4 if very exuding alginate dressings combined or not with silver, always with hydrocolloid plaque on top;
- L3 if less exudating hydrofibre dressings;
- L2 or L1 the same hydrocolloid plaque is the dressing, if slightly deep lesion collagen can be applied.

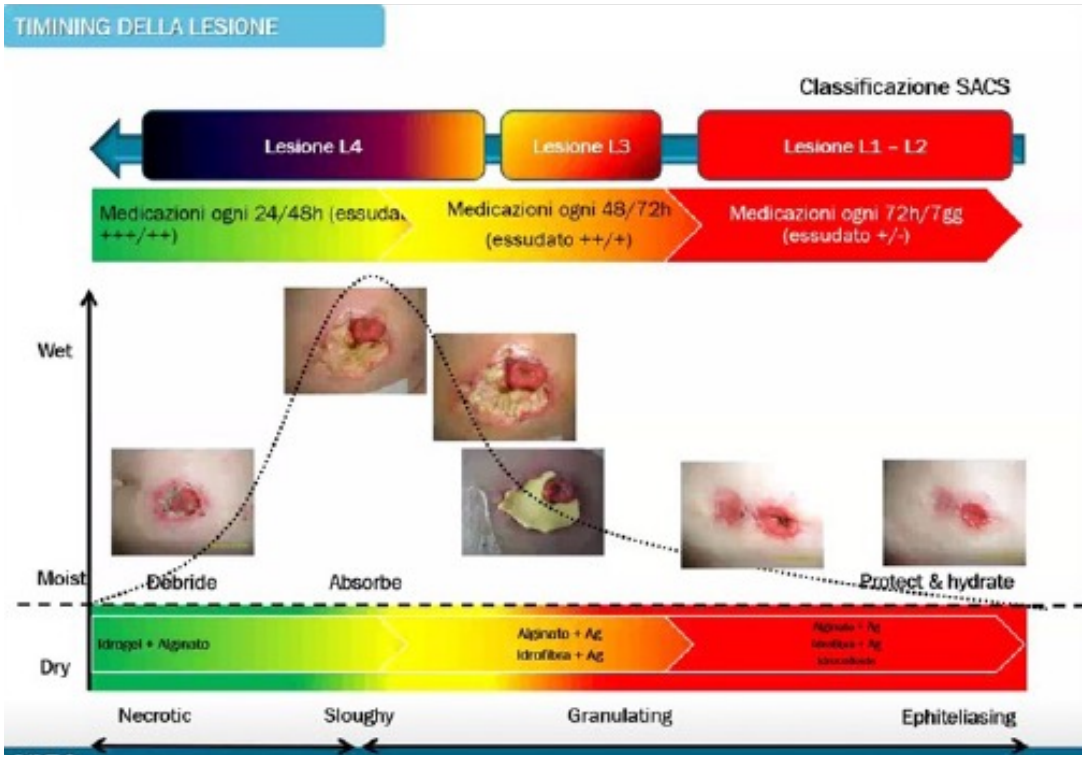
The S.A.C.S. classification in addition to the type of lesion L (which relates the lesion according to the depth or degree or severity and the type of tissue present) also identifies the Topography (T) of peristomal skin alterations, identifying quadrants around the stoma to describe the lesions from a topographical point of view.

- TI upper right quadrant
- TII upper left quadrant
- TIII lower left quadrant
- TIV lower right quadrant
- Total TV (including all quadrants)

Classification T (topographic) relates the basic lesion to its location. This instrument allows for a clear and unanimously accepted identification of the state of the injury. It is an assessment method for classifying peristomal skin lesions based on objective, shared, and validated criteria and to standardize diagnostic taxonomy and treatment23.




The following is an illustrative diagram with the timing of the dressing change.




From the literature of Wound Care it is important to read a lesion according to the TIME model, a guide focused on the principles of Wound Bed Preparation (WBP):

**T** (injury fabric/bottom)

**I** (infected/inflammation)

**M** (maceration/moisture imbalance)

**E** (epidermis)

The **TIME** evaluation criterion has been expanded in **TIMERS**, with the introduction of:

**R** reepithelialization and healing;

**S** social factor, identified ina path of education and enhancement of the skills of the stomed subject, represents a determining evaluation criterion[48].

So if you have a lesion bottom with necrotic/devitalized tissue (according to the black or yellow/slough color scale) you will have to proceed with enzymatic debridement with collagenase, autolytic debridement with hydrogel, surgical debridement. While if I have an infection (green wound bed color) it is managed with antiseptics or surfactants in solution, advanced dressings with silver or antimicrobials, possibly systemic antibiotic. If the lesion is exudative, alginates or hydrofibre or any polyurethane foams are used. If the bottom of the lesion is red (granulation tissue) or pink (neoepithelium) collagen or low adhesion dressings or hyaluronic acid can be used. It will also be possible, on surgical indication, to use negative pressure therapy. In addition, to correctly read a lesion it is necessary to evaluate the margins, the bottom, the exudate, the smell, the pain and the size, possibly the characteristics of the perilesional skin.

Also an important role is NUTRITION that allows the healing of injuries. It requires energy, proteins, vitamins A-E-C, zinc, trace elements, arginine and glutamine, which are responsible for the synthesis of collagen; they also stimulate the immune response and consequently prevent inflammation. Especially in the elderly there is a risk that these nutritional principles are lacking either by deficiency in the diet or by an increase in losses or by malabsorption, this can be corrected by adding dietary supplements[44,45,46].

The limitations of the study are given by a few articles that experiment in the field of stomatherapy the use of alginates / hydrofibres for the use of macerations or very exudative wounds, it would be useful to do observational studies on their effectiveness; little use of paper material to provide to the patient during the therapeutic education (as an information leaflet) so that the patient, who is often an elderly person, with images (which can be preventive strategies) can be clear when he has an onset of skin alteration so that he seeks professional advice in a timely manner.

Concluding the key message that we want to convey with this review of the literature is that the peristomal skin integrity is a fundamental requirement for the person with ostomy, because it allows a safe and effective adhesion of the plaque of the collection system, resulting in acceptance by the patient to the new situation, also improves the quality of life and reduces health costs.

Therefore, an excellent therapeutic education in the management of the ostomy is essential, at the time of the stoma care or when taking care of the patient, it is necessary to give adequate, simple and detailed information (perhaps supported by informative paper material), in order to prevent peristomal skin alterations. In addition, the health professional can apply the scientific evidence that has emerged to optimally treat peristomal skin changes, not causing the problem to negatively affect the patient and bringing the healing of the skin as soon as possible, a fundamental point.

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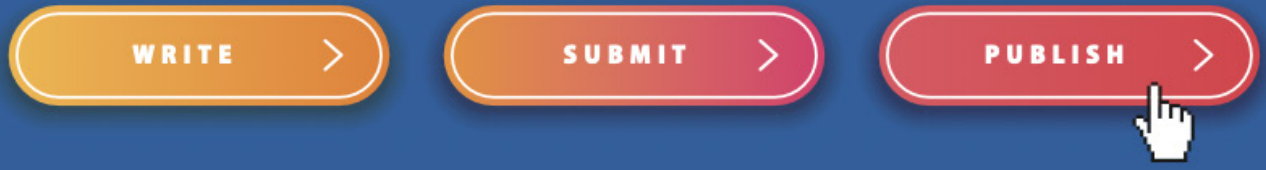
*And he/she will take all the glory.*

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