

# Non-Proportional Medical Interventions at the End of Life in a Tertiary Care Hospital in Colombia

## Intervenciones médicas no proporcionales al final de la vida en un hospital de alta complejidad en Colombia

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FRITZ EDUARDO GEMPELER RUEDA<sup>a</sup>

Anesthesiologist. Master in Bioethics. Associate Professor, School of Medicine, Pontificia Universidad Javeriana, Bogotá, Colombia. Clinical Ethics Service, Hospital Universitario San Ignacio, Colombia  
ORCID: <https://orcid.org/0000-0002-6036-9155>

LILIAN TORREGROSA ALMONACID

Surgeon. Specialist and Master in Bioethics. Associate Professor, School of Medicine, Pontificia Universidad Javeriana, Bogotá, Colombia. Clinical Ethics Service, Hospital Universitario de San Ignacio, Colombia  
ORCID: <https://orcid.org/0000-0002-5392-7083>

DANIELA MARÍA CUADRADO

Surgeon, Hospital Universitario de San Ignacio. Master in Bioethics, Pontificia Universidad Javeriana, Bogotá, Colombia. Clinical Ethics Service, Hospital Universitario de San Ignacio, Colombia  
ORCID: <https://orcid.org/0000-0002-2726-2356>

SOFÍA BARRIGA RODRÍGUEZ

Twelfth semester medical student, School of Medicine, Pontificia Universidad Javeriana, Bogotá, Colombia  
ORCID: <https://orcid.org/0000-0001-7407-7893>

JERÓNIMO SOTOMAYOR LONDOÑO

Twelfth semester medical student, School of Medicine, Pontificia Universidad Javeriana, Bogotá, Colombia  
ORCID: <https://orcid.org/0000-0001-6637-0766>

MARÍA PAULA JASSIR ACOSTA

Twelfth semester medical student, School of Medicine, Pontificia Universidad Javeriana, Bogotá, Colombia  
ORCID: <https://orcid.org/0000-0002-9682-2759>

JUAN DAVID FILIZZOLA BERMÚDEZ

Twelfth semester medical student, School of Medicine, Pontificia Universidad Javeriana, Bogotá, Colombia  
ORCID: <https://orcid.org/0000-0001-5939-1104>

DANIEL URIBE RUEDA

Twelfth semester medical student, School of Medicine, Pontificia Universidad Javeriana, Bogotá, Colombia  
ORCID: <https://orcid.org/0000-0002-6682-0509>

<sup>a</sup> Corresponding author: [gempeler@gmail.com](mailto:gempeler@gmail.com)

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### ABSTRACT

**Purpose:** To analyze the interventions carried out in a cohort of patients who died in a tertiary university hospital and define their therapeutic proportionality, based on the study of the prevalence of “non-beneficial treatments”. **Methodology:** Retrospective descriptive observational study, based on the review of medical records of patients who died in a two-year period in a tertiary university hospital. **Results:** 931 records of deceased patients were analyzed and categorized according to the criteria of “therapeutic proportionality”. It was found that 54.7 % of the patients underwent diagnostic or therapeutic interventions classified as “disproportionate” according to the applied definition. **Conclusion:** Non-proportional or non-beneficial end-of-life interventions are prevalent in the clinical practice, which is a persistent problem of modern medicine

that needs to be addressed, because of their negative impact on patients, families, health professionals and the health system.

**Keywords**

bioethics; ethics; medical; medical futility; humanization in medicine.

**RESUMEN**

**Objetivo:** Analizar las intervenciones realizadas en una cohorte de pacientes fallecidos en un hospital universitario de alta complejidad y definir su proporcionalidad terapéutica a partir del estudio de la prevalencia de “tratamientos no benéficos”. **Metodología:** Estudio observacional descriptivo retrospectivo, basado en la revisión de historias clínicas de los pacientes fallecidos en el periodo de dos años en un hospital universitario de alta complejidad en Colombia. **Resultados:** Se analizaron 931 historias de pacientes fallecidos, y en la categorización de acuerdo con el criterio de “proporcionalidad terapéutica” se encontró que en el 54,7 % de los pacientes se realizaron intervenciones diagnósticas o terapéuticas clasificadas como “no proporcionales”, según la definición aplicada. **Conclusión:** Las intervenciones no proporcionales o no benéficas al final de la vida son prevalentes en la práctica actual, lo que constituye un problema mayor que la medicina moderna debe resolver, dadas las repercusiones negativas sobre los pacientes, las familias, los profesionales de la salud y el sistema de salud.

**Palabras clave**

bioética; ética médica; inutilidad médica; futilidad; humanización de la atención-intervenciones terapéuticas; proporcionalidad terapéutica.

**Introduction**

Advances in technology and medical therapeutics have increased health recovery in many patients and clinical situations. This does not mean that the possibilities of modern clinical care are limitless, as there are different clinical circumstances leading to the end of life where the death of the patient is inevitable. In these situations, the objective of health care should change from an unattainable goal, such as healing, towards that of care and relief of symptoms, maintaining the best comprehensive quality of life of the patient: physical, emotional, mental and spiritual.

In many cases, the end-of-life scenario can be predicted, especially for chronic, debilitating and incurable diseases. Unfortunately, despite this, disproportionately aggressive curative efforts are often maintained that produce no real benefit to

the patient, and often prolong their agony and deteriorate the quality of the little life time that remains (1). These interventions are considered non-beneficial (2), non-proportional (1) or futile treatments, and perpetuate a frequent practice in modern clinical practice that causes moral distress in health personnel, unethical actions and waste of the always limited and often scarce resources.

The lack of universal agreements on the definition of terms such as futile, inappropriate, excessive, non-beneficial and non-proportional treatments or interventions, has hindered global dialogue on this topic (2,3) and the quantification of its magnitude. However, advancing in the study of these complex practices typical of today’s medicine is an obvious need that requires reaching some agreements to propose possible solutions.

The concept of futility can be taken as a subjective perception of the loss of benefit of a treatment, taking into account multiple elements associated and not limited to physiological response, such as social, economic and personal factors, the wishes of the patient and their family, among others. For this reason, the definition of the futility of a treatment in a specific patient cannot be extrapolated to other patients, and it is difficult to quantify it in clinical practice (4,5).

The term *non-beneficial treatment*, used by Singal et al. (6), is defined as an intervention that is ineffective in achieving the proposed objectives or is not useful from the patient’s point of view (7,8). Some authors not only talk about treatments, but also about non-beneficial or non-proportional interventions, since performing paraclinical tests, diagnostic images and even taking vital signs at the end of life can cause discomfort to the patient, without bringing him/her any direct benefit (9).

Non-beneficial treatments and interventions at the end of life continue to be a problematic issue in current medical practice, despite the fact that in recent decades, numerous publications have sought to address the issue. The absence of a unified definition and the dispute between the proposals to use quantitative or qualitative parameters to confirm it have

caused controversies that are still ongoing, and this has contributed to little progress in concrete and pragmatic solutions to this problem.

The reality is that many clinicians perceive that the therapies they administer to their patients are at times not beneficial, and there is growing concern about the use of therapies of questionable utility that easily lead to “therapeutic obstinacy” or that do not benefit the quality of life of the patients (10, 11, 12, 13). Specific studies show that up to 11% of patients admitted to the intensive care unit (ICU) receive care that their doctors consider to be not beneficial (14). A review of the 2016 literature on the subject, with more than 1,200,000 patients, showed that between 30% and 38% of the deceased patients underwent useless or inappropriate treatments in their last days (2). Along the same lines, the publication by Schmidt et al. (15), in 2014, stated that “non-beneficial treatments” at the end of life were not only ineffective, unethical and costly, but in most cases they did not match the patients’ wishes.

It will always be possible to discuss whether in a particular case an intervention was futile or not, since there is no universal agreement on the criteria that define futility, and that determination cannot be absolute either. With this in mind, to search for the cases analyzed in this study, we defined a retrospective look at a group of patients who died while hospitalized in a tertiary care institution. We specifically reviewed each clinical history in terms of the interventions performed during the final stage of life, in order to study in each one its benefit within the patient’s clinical course.

This work does not intend to address in depth the existing and unresolved theoretical discussion on the extensive and complex issue of *non-beneficial treatments*. However, in order to adopt a reference point against which to compare each of the interventions evaluated, we chose among the proposals in the literature the one proposed by Cardona-Morrel (2) in the following terms: treatments or interventions that are performed with little or no hope of achieving any effect, largely because of the patient’s underlying health status and known

or expected poor prognosis, regardless of the treatment itself. This reflects an objective inverse correlation between the intensity of treatment and the expected degree of improvement in the patient’s health status, ability to survive after discharge from hospital or improvement in their quality of life (2).

The aim of this study was to analyze the interventions carried out in a cohort of deceased patients in a tertiary care university hospital and to define their therapeutic proportionality, based on the study of the prevalence of non-beneficial treatments.

## Methodology

Retrospective descriptive observational study, based on the review of medical records of deceased patients in the period 2016-2017 in a tertiary care university hospital in Colombia. The inclusion criteria were: all adults over 18 years of age with a hospitalization time of more than 24 hours in the institution before their death, and complete information in the medical record.

After obtaining the approval of the Institutional Ethics Committee, and complying with all the rules of confidentiality and security of patients’ data, a research group independent from the teams that treated the patients performed the documentary review of all medical records.

All the information was recorded in a database (Excel version 2.1), which included demographic information on the patients and on each of the interventions they received during hospitalization in the days prior to death. Based on this registry and the complete analysis of each case, a medical team categorized each intervention as proportional or non-proportional, according to the criteria of *therapeutic proportionality* described above.

In case of discrepancy in the opinions, the case was evaluated in a second round by medical experts in the medical specialty corresponding to the clinical situation of the patient, in order to reach a consensus on the rating of the intervention.

## Results

During the period studied, a total of 1499 patients died in the institution, of which 931 met the inclusion criteria. Of these, 468 patients (50.3%) were male, and 463 (49.7%) were female, with an average age of 66 years (range of 18 to 96 years; standard deviation [SD] = 16). The 931 patients remained hospitalized an average of 13.4 days before death, with a range between 2 and 223 days (SD = 16.9).

As can be seen in Table 1, the main diagnoses in this cohort corresponded to oncological pathologies, terminal-stage cancer (stage IV according to the AJCC-NCCN classification) in 453 patients (48.7%), followed by sepsis of different origins and cardiopulmonary diseases.

**Table 1**

*Definitive diagnoses*

Definitive diagnosis	%	n
Terminal cancer diseases	48.7	453
Sepsis of different origins	22.3	208
Cardiopulmonary diseases	16.0	151
Central nervous system diseases including neurodegenerative diseases	7.0	63
Other	6.0	56
Total	100.0	931

In the categorization according to the criterion of therapeutic proportionality, 509 patients (54.7% of the deceased) underwent diagnostic or therapeutic interventions classified as non-proportional (Figure 1). In 46 cases there was a discrepancy in the initial categorization, so they were evaluated in a second round by medical experts in the medical specialty corresponding to the patient's clinical situation (different from the treating physicians), in order to reach a consensus on the rating of the intervention.

**Figure 1.**

*Proportionality in End-of-Life Interventions*



Table 2 summarizes the most frequent non-proportional interventions found when reviewing the 931 medical records, and which are described below. It should be noted that often more than one non-proportional intervention was carried out per patient.

**Table 2**

*Most frequent nonproportional interventions*

Intervention	Total events observed	Percentage of non-proportional (n)
Chemotherapy	98	76.5 (75)
Transfusion	175	73.7 (129)
Radiation therapy	42	71.4 (30)
Artificial nutrition	102	69.6 (71)
Diagnostic imaging	565	67.8 (383)
Cardiopulmonary resuscitation	113	67.2 (76)
Gastrostomy	15	66.7 (10)
Vasopressors	307	65.8 (202)
Laboratory tests	721	65.3 (471)
Dialysis	49	63.2 (31)
Mechanical ventilation	277	63.2 (175)
ICU admission	407	62.6 (255)
Surgery	320	59.4 (190)
Antithrombotic prophylaxis	277	55.2 (153)

*Admission to the intensive care unit:* Regarding the location of the deaths, 407 patients (43.7%) died in the ICU. For this group, the criteria for admission to the unit were also analyzed, and the measure was rated as non-proportional in 62.6% of the patients (n = 255 patients).

*Cardiopulmonary Resuscitation (CPR):* 113 patients (12.1%) received CPR in the 48 hours prior to death. When analyzing the criteria applied at the time of CPR in each case, the intervention was classified as non-proportional

in 76 patients (67.3%). Of this group, 30 patients had an established diagnosis of terminal cancer disease, and in 83% of them the CPR intervention was non proportional.

*Do-not-resuscitate orders:* 727 patients in the cohort (78.1%) had do-not-resuscitate orders specifically recorded in the medical record. In this group, 18 patients (2.5%) underwent this intervention.

*Laboratory tests:* in the 48 hours prior to death, 77.4% of the patients (721) underwent laboratory tests, procedures that were considered non-proportional in 65.3% of the cases.

*Diagnostic images:* in the 48 hours prior to death, 565 patients (60.7% of the cohort) underwent diagnostic imaging, such as simple radiological studies, ultrasound scan, tomography and MRI, interventions that were considered non-proportional in 67.8% of the cases.

*Surgical procedures:* 320 patients (34.4%) were taken to surgery in their last two weeks of life. Of these interventions, 59.4% were considered non-proportional. Among the most frequent were gastrostomies (67% of cases considered non-proportional), thoracotomies and laparotomies.

*Artificial nutrition:* 46% of these patients had oral nutrition orders until death. In 43% of the cases the oral route had been suspended and 11% had artificial nutrition formulation (nasoenteral route, gastrostomy or peripheral or central route for parenteral feeding). The independent analysis of each of these cases showed that artificial nutrition was considered non-proportional in 71 patients (70% of the 102 patients who received this intervention).

*Palliative Chemotherapy:* Of 453 patients with a terminal cancer diagnosis, 98 received chemotherapy in the last two weeks of life. This intervention was considered non-proportional in 75 of them (76.5%).

*Transfusions:* 175 patients (19%) received transfusions of blood products, which was considered non-proportional in 129 patients (74%).

## Discussion

The study shows that more than half of the patients who died during the period observed underwent interventions in their last days of life that were considered non-beneficial or non-proportional. This value is above the 38% reported by Cardona-Morrell et al. (2).

The retrospective methodology can partly explain this value, since it is possible that at the time the treating teams put forward reasons or justifications to indicate some interventions, but which were not recorded in the medical record. Additionally, these results show a lack of recognition of the closeness of death in a significant number of patients, as well as lack of knowledge and probably ambiguity about what is considered futile or non-beneficial treatment, on the part of the different treating groups.

The analysis of these results reflects a persistent culture in current medicine of “doing everything possible” and prolonging life in spite of everything (16), a behavior that can have very serious consequences that affect both the quality of life and the natural processes of good dying that could receive greater support from the palliative care services and even occur outside the hospital or ICU setting.

On the other hand, such behaviors—which may even be unethical when a patient without the possibility of benefiting from an intervention is subjected to a spectrum of physical, psychological, emotional and economic damages—also affect their loved ones, and should be analyzed in the hospital setting, in order to generate corrective measures and best practices that prevent and limit them as far as possible. It should not be forgotten that futile interventions also have a significant negative impact on the financial sustainability of health services (17).

The most frequent non-proportional interventions were the performance of paraclinical tests (hematocrit, hemoglobin, glycemia and electrolytes, among others), under the indication of “routine laboratory testing”, and diagnostic images. Such interventions could be warranted if it is believed that the patient

is recoverable and it is necessary to constantly evaluate these parameters in their evolution. But in an end of life process, when they do not lead to changes in medical behaviors, they have no justification and threaten the patient's well-being, by generating discomfort and even the possibility of iatrogenesis.

Admission to the ICU was one of the most frequently observed interventions, since almost half of the patients were admitted to the unit to die there, as shown by the 62% of admissions that were classified as non-proportional. This high figure can be partly attributed to the uncertainty in the face of certain complex and multiple pathologies, as well as to the weight that pressure from patients or relatives has on the decision to admit patients to intensive care in cases where it is estimated that this measure would have a questionable clinical benefit or none at all. Despite this, this behavior is extremely questionable as part of end-of-life care.

As for CPR, it only occurred in 12.1% of the patients who died, which may be influenced by the existence of do-not-resuscitate orders in a high number of patients in the cohort (78.1%), a figure significantly higher than that reported in other countries (18, 19, 20). Likewise, an increase in the frequency of do-not-resuscitate orders is seen when comparing the study carried out in the same hospital two years earlier, where a frequency of 70.9% was found (21). It is possible that this high rate of do-not-resuscitate orders and, therefore, the low frequency of CPR, is influenced by the different interventions of the institution's Clinical Ethics Service and the establishment of a hospital end-of-life protocol, which always takes into consideration the patients' advanced directives regarding this issue.

Although it is true that the frequency of CPR in this cohort is relatively low, it is still being performed on patients who are terminally ill and unrecoverable, which is why they were considered as non-proportional in 67.3% of the cases.

The results of the present study confirm the difficulty that still exists in identifying those patients who are at the end of lives and the insistence on carrying out all possible

measures to prolong life. This is perhaps influenced by multiple factors mentioned by other authors, such as the moral distress of health personnel, communication failures, family pressure, available resources, labor and legal concerns (22), and also by the "clinical inertia" that leads physicians to not pay sufficient attention to the prognosis and future quality of life of the patient (23,24) and the perception of death as a therapeutic failure, which leads to the maintenance of one intervention after another as the "default option" for patients who come to a hospital (11).

This is a retrospective study, based on the reconstruction of clinical situations from documentary records in the medical record. Because of this, there is the problem of under-reporting, which can limit the assessment of specific medical reasons related to the explicit wishes of some patients or their representatives in making different decisions. It is also important to note that this retrospective evaluation of interventions may be subject to the bias of knowing the fatal outcome in patients.

## Conclusions

It is confirmed that in current practice, non-proportional or non-beneficial interventions at the end of life are prevalent, which constitutes a major and persistent problem, despite their recognized negative consequences on patients, families, health professionals and the health system.

These practices have multiple origins, so they probably cannot be completely eliminated from clinical practice. Because of this, progress should be made in educational strategies that begin with the recognition of the magnitude of the problem and strengthen the making of these complex clinical decisions. These must involve patients, who are irreplaceable in defining, from their particular conditions, which interventions they would consider valuable and acceptable at the end of their lives.

Clinical judgment has shown its fallibility in predicting the actual benefit of various

treatments, especially those performed in situations of incurable disease. Not everything that is medically and technically possible is appropriate from an ethical point of view, so it is necessary to weigh all the elements at stake around this decision, which privileges the quality of life at the end of existence.

The results of this study warrant further research into the determinants of decision making by medical teams regarding end-of-life interventions in different clinical settings.

### Conflict of interest

The authors declare that they have no conflict of interest.

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