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Neutrosophic Personality Traits and Ethical Competencies in Palliative Care Professionals

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Abstract

The present study aimed to demonstrate the applicability of neutrosophic logic in investigating the relationship between the personality traits of a group of palliative care professionals and the ethical aspects inherent in their work. Neutrosophic correlation coefficients were employed to identify the most influential personality traits in the ethics of palliative care, as well as the ethical competencies with the greatest impact. The results revealed differences in personality traits, with nurses showing higher sensitivity than doctors, and doctors exhibiting greater kindness. Furthermore, varying degrees of relationships between personality traits and ethical competencies were identified. The neutrality, indeterminacy, and non-truth of the personality traits and competencies analyzed from a neutrosophic perspective allow for a more precise and nuanced evaluation of how palliative care professionals relate to patients and their families. These elements provide a solid foundation for understanding the interaction between ethical aspects and the personality traits of healthcare professionals.

Keywords: Neutrosophic Personality, Ethics, Palliative Care, Neutrosophic Correlation.

1 | Introduction

Palliative care represents a comprehensive and humanitarian approach to healthcare, aimed at improving the quality of life for patients facing advanced and often incurable illnesses. At the core of this care is the patient and their well-being, making professional ethics fundamentally relevant.

Ethics in palliative care is grounded in the fundamental principles of ethical healthcare, such as respect for patient autonomy, beneficence, non-maleficence, and justice. However, in this context, ethics takes on specific nuances related to the particular needs of patients facing the end of life.

Various factors of utmost delicacy are interwoven in this spectrum, for both patients and professionals in the field, as well as their families. Empathy, compassion, and honesty are ethical virtues necessary to help patients

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understand their situation and make informed decisions. Ensuring that patients live their final days with comfort and dignity is an unavoidable ethical responsibility.

Furthermore, equity and justice in care must be addressed, avoiding biases and ensuring that all patients receive the necessary attention, regardless of their ethnic background, gender, sexual orientation, or financial capacity. Ethics in palliative care is also related to family-centered care. Professionals must recognize the emotional impact that end-of-life care has on families and provide support to both the patient and their loved ones.

Decision-making in the context of palliative care is a highly sensitive area. Professionals in this specialty face situations where they must address decisions of great significance, such as the possible suspense of invasive medical treatments or consideration of unconventional maneuvers. These decisions must be made with the highest level of ethics and compassion, always prioritizing the well-being and quality of life of the patient. In this context, the competencies and personality traits of professionals become critically important in the treatment and care of patients and their loved ones.

Empathy, patience, effective communication, and the ability to handle uncertainty are characteristics that enable professionals to provide ethical and compassionate support to patients and their loved ones. Ethical decision-making requires special attention to the values, wishes, and beliefs of the patient, and a personality oriented toward respect and understanding of these issues. These aspects make the study of healthcare professionals a critical element in providing palliative care.

Human behavior is of extreme complexity and arises as a result of a series of simultaneous interactions between different aspects, including multiple egos, alter-egos, and alter-superegos [1]. In reality, it is difficult to find an individual who fully adheres to a single personality trait; this could only occur in a purely idealistic context. This phenomenon reflects the diversity and richness of human behavior in its complexity [2].

Neutrosophy is an innovative psychological theory that focuses on the study of the human soul or spirit through the application of neutrosophy and neutrosophic logic [3]. Neutrosophy, a philosophical discipline that originated with Smarandache's work in 1995, is considered an extension of dialectics and is dedicated to the study of the origin, nature, and scope of neutralities, as well as their interactions with various ideational spectrums [4]. Neutrosophic logic provides conceptual, operational, and ideational tools to explore these issues [5].

The foundation of this theory is based on neutrosophic psychological concepts and assumptions expressed through a triadic form, represented as (<A>, <neutA>, <antiA>), where each component reflects a different dimension (positive, neutral, and negative) of human thought and experience [6]. This theory also includes nuances such as insufficient thinking, normal thinking, and anti-thinking, among others, and their refinements. [7]

In the context of this theory, neutropsychic personality traits are presented as a dynamic and open psychological system that shapes individual tendencies to feel, think, and act in a specific way [8]. This approach allows for the assertion that neutrosophic psychological theory contemplates the fundamental concepts of traditional psychology but explores them from the perspective of a triad of possible states (<A>, <neutA>, <antiA>). This triad of states offers a unique and nuanced perspective on human psychology, making it an extremely interesting and promising field of study [9].

The main objective of this study is to demonstrate the applicability of neutrosophic logic to investigate the relationship between the personality traits of a group of palliative care professionals and the inherent ethical aspects of their work. In this context, neutrosophic correlation coefficients are used as a valuable tool in the decision-making process. This methodology is presented as an effective approach to establish comparison measures between various elements and subsequently use these measures in formulating fundamental conclusions in the decision-making process.

In this study, an exhaustive analysis of fundamental concepts related to Neutrosophic Psychology Theory is first conducted. Subsequently, the proposed decision-making method is examined in detail, outlining its functioning and applicability. The foundations on which the analysis was carried out are then established, the obtained results are presented, and finally, the conclusions derived from the research are presented.

2 | Foundation

The triplet of elements $(< A >, < neutA >, < antiA >)$ is expanded in the context of discrete refined neutrosophic memory, in which a collection of pairs of sets is defined: $(< A > 1, < A > 2, \ldots, < A > l; < neutA > 1, < neutA > 2, \ldots, < neutA > m; < antiA > 1, < antiA > 2, \ldots, < antiA > n)$through the framework of refined neutrosophy.

When three subsets A, B, and C are considered within a universe of discourse, certain axioms must hold for the neutrosophic set to be valid. These axioms state that $A \cap B = \emptyset$ (A intersection B is empty), $B \cap C = \emptyset$ (B intersection C is empty), $C \cap A = \emptyset$ (C intersection A is empty), and $A \cup B \cup C = U$ (the union of A, B, and C encompasses the entire universe of discourse U). Consequently, A, B, and C represent a disjoint partition of the universe of discourse U.

The refined neutrosophic set of type 2 (and analogously for types 1 and 3) is defined as follows: $A = A_1 \cup A_2 \cup \ldots \cup A_p, B = B_1 \cup B_2 \cup \ldots \cup B_r, C = C_1 \cup C_2 \cup \ldots \cup C_s$, where $A \cap B = B \cap C = C \cap A = \emptyset$ (the intersections between the subsets are empty). In this context, p, r, and s are integers greater than or equal to 1, with the restriction $p + r + s \geq 4$. Furthermore, $A_i \cap A_j = \emptyset$for i, j∈{1, 2, …, p}, i≠j; $B_k \cap B_l = \emptyset$ for $k, l \in \{1, 2, \ldots, r\}, k \neq l$; and $C_m \cap C_n = \emptyset$ for m, $n \in \{1, 2, \ldots, s\}, m \neq n$.

Several personality trait experts and theorists have concluded that the human position lies on a continuum between two opposing traits, implying dynamic behavior. In a broader generalization of all models of traits, any number n ≥ 1 of traits (<Aj>) and their corresponding antitraits (<antiA j>) can be considered, for 1≤ j ≤ n:

$< A\_1 > / < antiA\_1 >, < A\_2 > / < antiA\_2 >, \ldots, < A\_n > / < antiA\_n >$.

If the degree of a Trait is equal to or greater than the Trait threshold (ThT), it can be said that the individual presents this Trait. Similarly, if the degree of antiTrait is equal to or less than the antiTrait threshold (antiThr), then the individual displays antiTrait characteristics. Within a small neighborhood of the midpoint, spanning the interval $[-\varepsilon, \varepsilon]$, the degree becomes more unclear or indeterminate, representing a combination close to half Trait and half antiTrait.

Personality traits can be quantified by calculating the degrees of <A> (Trait) and <antiA> (antiTrait). In reality, no individual completely adheres to a personality trait since this would be an idealistic condition. Therefore, the constants -antiThr, +Thr, and ε vary depending on each antiTrait/Trait pair and may differ from one pair to another. These constants are usually determined by psychology experts according to the objectives of the research.[10].

In this context, for any pair of Trait and antiTrait and an individual x who is part of a group of people S, the following functions are defined:

- dTrait: $S \rightarrow [0,1]$, where dTrait(x) represents the degree of the Trait that characterizes individual x.

- dantiTrait: S → [-1,0], where dantiTrait(x) indicates the degree of antiTrait that characterizes individual x.

The Neutrosophic Trait Operator is introduced, which combines opposites and represents the cumulative degree of individual x in relation to both the Trait and the antiTrait. This operator is defined as:

- dTrait & antiTrait: $S \rightarrow [-1,1]$, where $dTrait\,\&\,antiTrait(x) = dTrait(x) + dantiTrait(x)$.

For each Trait - antiTrait pair, the degrees of Trait (dTrait(x)) and antiTrait (dantiTrait(x)) that characterize individual x are calculated. Then, the Neutrosophic Trait Operator (dTrait & antiTrait(x)) is used and compared with the ThT and antiThr thresholds.

- If $dTrait\ \&\ antiTrait(x) \geq +Thr$, then the individual is categorized as definitely belonging to the Trait,
- If $dTrait\ \&\ antiTrait(x) \leq -antiThr$, then the individual is categorized as definitely belonging to the antiTrait.
- If $dTrait\ \&\ antiTrait(x) \in (-\varepsilon, +\varepsilon)$, then the individual is classified as a state in a totally indeterminate state between the Trait and the antiTrait.
- If $dTrait\ y\ antiTrait(x) \in (\varepsilon, Thr)$, then the individual is classified as belonging primarily to the Trait.
- And finally, if $dTrait\ \&\ antiTrait(x) \in (-antiThr, -\varepsilon)$, then the individual is categorized as mostly belonging to the antiTrait.

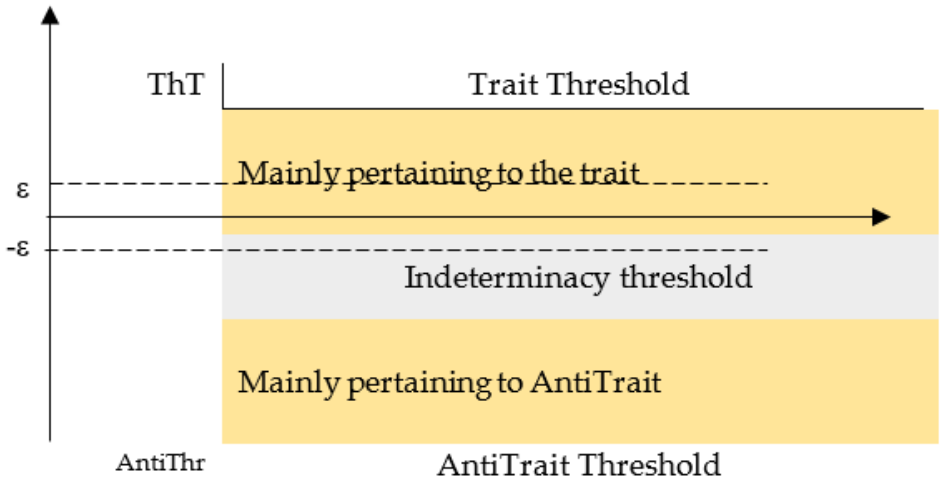

Figure 1. Trait membership thresholds or AntiTrait.

3 | Correlation Coefficient of SVNSs

The definitions of neutrosophic sets and SVNSs (Single-Value Neutrosophic Sets) provide a basis for understanding and correctly applying the theory in practical contexts.

Firstly, it must be clarified that a neutrosophic set A in a point space X, where each generic element in X is denoted as x, is characterized by three membership functions: truth $(T_A(x))$, indeterminacy $(I_A(x))$, and falsehood $(F_A(x))$. These functions assign values in the range [0, 1] to each point x in X, implying that a neutrosophic set is defined as $A = \{x, T_A(x), I_A(x), F_A(x) | x \in X\}$. There are no restrictions on the sum of the membership functions, so $0 \leq T_{A(x)} + I_{A(x)} + F_{A(x)} \leq 3$[11].

[12] introduces the concept of SVNS in a point space X. Similar to the definition of neutrosophic sets, an SVNS A is characterized by three membership functions: truth $(T_A(x))$, indeterminacy $(I_A(x))$, and falsehood $(F_A(x))$, where $T_{A(x)}, I_{A(x)}$, and $F_{A(x)}$ vary in the range [0, 1]. An SVNS A is represented as $A = \{x, T_A(x), I_A(x), F_A(x) \mid x \in X\}$. In this case, the sum of the membership functions satisfies the condition $0 \leq T_A(x) + I_A(x) + F_A(x) \leq 3$. In this context, an SVNS A is considered to be contained within another SVNS $B, A \subseteq B$ if and only if $T_A(x) \leq T_B(x), I_A(x) \geq I_B(x)$, and $F_A(x) \geq F_B(x)$ for every x in X. Meanwhile, two SVNSs A and B, whatever they may be, are equal if $A \subseteq B$ and $B \subseteq A$ [13].

Additionally,[14] has defined that for any two SVNSs A and B in the discourse universe $X = \{x_1, x_2, \ldots, x_n\}$, the correlation coefficient between A and B can be defined as follows:

$$M(A,B) = \frac{1}{3n}\sum_{i=1}^{n}[\phi_i(1-\Delta T_i) + \varphi_i(1-\Delta I_i) + \psi_i(1-\Delta F_i)] \quad (1)$$

where

$$\phi_i = \frac{3-\Delta T_i - \Delta T_{max}}{3-\Delta T_{min} - \Delta T_{max}},$$

$$\varphi_i = \frac{3-\Delta I_i - \Delta I_{max}}{3-\Delta I_{min} - \Delta I_{max}},$$

$$\psi_i = \frac{3-\Delta F_i - \Delta F_{max}}{3-\Delta F_{min} - \Delta F_{max}},$$

$$\Delta T_i = |T_A(x_i) - T_B(x_i)|,$$

$$\Delta I_i = |I_A(x_i) - I_B(x_i)|,$$

For all $xi \in X$ and i = 1, 2, . . ., n

$$\Delta T_i = |T_A(x_i) - T_B(x_i)|,$$

$$\Delta T_{min} = min_i|T_A(x_i) - T_B(x_i)|,$$

$$\Delta I_{min} = min_i|I_A(x_i) - I_B(x_i)|,$$

$$\Delta F_{min} = min_i|F_A(x_i) - F_B(x_i)|,$$

$$\Delta T_{max} = max_i|T_A(x_i) - T_B(x_i)|,$$

$$\Delta I_{max} = max_i|I_A(x_i) - I_B(x_i)|,$$

$$\Delta F_{max} = max_i|F_A(x_i) - F_B(x_i)|,$$

In such a context, however, [15] defines that differences in the importance of elements within the universe should be considered, implying the consideration of the weight of the element $x_i(i = 1, 2, \ldots, n)$. To do this, a weighted correlation coefficient is applied between SVNSs, taking into account that if w_i is the weight of each element $x_i\ (i = 1, 2, \ldots, n), w_i \in [0, 1]$, and $\sum_{i=1}^{n} w_i = 1$, then the following weighted correlation coefficient between two SVNSs A and B is obtained:

$$M_w(A,B) = \frac{1}{3}\sum_{i=1}^{n} w_i[\phi_i(1-\Delta T_i) + \varphi_i(1-\Delta I_i) + \psi_i(1-\Delta F_i)] \quad (2)$$

In the context of the multi-attribute decision-making problem with single-valued neutrosophic information, the characteristic of an alternative $A_i\ (i = 1, 2, \ldots, m)$ on an attribute $C_j\ (j = 1, 2, \ldots, n)$ is represented by an SVNS of form $A_i = \{C_j, T_{Ai}(C_j), I_{Ai}(C_j), F_{Ai}(C_j) | Cj \in C, j = 1, 2, \ldots, n\}$.

Where $T_{Ai}(C_j), I_{Ai}(C_j), F_{Ai}(C_j)) \in [0, 1]$, and $0 \leq T_{Ai}(C_j), I_{Ai}(C_j), F_{Ai}(C_j) \leq 3$for $Cj \in C, j = 1, 2, \ldots, n$, y $i = 1, 2, \ldots, m$. For convenience, the values of the three functions $T_{Ai}(C_j)$, $I_{Ai}(C_j), F_{Ai}(C_j)$, are denoted by a single-valued neutrosophic value (SVNV) $d_{ij} = < t_{ij}, i_{ij}, f_{ij} >$ $(i = 1, 2, \ldots, m;\ j = 1, 2, \ldots, n)$, which is usually derived from the evaluation of an alternative A_i with respect to a criterion C_j by the expert or decision maker. Therefore, a single-valued neutrosophic decision matrix $D = (d_{ij})_{mxn}$ can be obtained.

In the realm of decision-making problems involving multiple attributes, the concept of an "ideal point" has been employed to facilitate the identification of the optimal alternative within a set of decisions. Even though a truly ideal alternative does not exist in reality, this concept provides a valuable theoretical construct that serves as a reference for evaluating available alternatives. The notion of the ideal point allows for the establishment of a theoretical standard against which different options can be compared and assessed.

In the decision-making method, an ideal NSN can be defined as $d_j^* = < t_j^*, i_j^*, f_j^* > = < 1, 0, 0 >$ $(j = 1, 2, \ldots, n)$ for the ideal alternative A^*. Therefore, applying Equation (2), the weighted correlation coefficient between an alternative $A_i\ (i = 1, 2, \ldots, m)$ and the ideal alternative A^* is given by:

$$M_w(A_i, A^*) = \frac{1}{3}\sum_{j=1}^{n} w_j\left[\phi_{ij}\left(1-\Delta t_{ij}\right) + \varphi_{ij}\left(1-\Delta i_{ij}\right) + \psi_{ij}\left(1-\Delta f_{ij}\right)\right] \quad (3)$$

where

$$\phi_{ij} = \frac{3 - \Delta t_{ij} - \Delta t_{i\,max}}{3 - \Delta t_{i\,min} - \Delta t_{i\,max}},$$

$$\varphi_i = \frac{3 - \Delta i_{ij} - \Delta i_{i\,max}}{3 - \Delta i_{i\,min} - \Delta i_{i\,max}},$$

$$\psi_i = \frac{3 - \Delta f_{ij} - \Delta f_{i\,max}}{3 - \Delta f_{i\,min} - \Delta f_{i\,max}},$$

$$\Delta t_{ij} = \left|t_{ij} - t_j^*)\right|,$$

$$\Delta i_{ij} = \left|i_{ij} - i_j^*)\right|,$$

$$\Delta f_{ij} = \left|f_{ij} - f_j^*)\right|,$$

$$\Delta t_{i\,min} = min_j\left|t_{ij} - t_j^*\right|,$$

$$\Delta i_{i\,min} = min_j\left|i_{ij} - i_j^*\right|,$$

$$\Delta f_{i\,min} = min_j\left|f_{ij} - f_j^*\right|,$$

$$\Delta t_{i\,max} = max_j\left|t_{ij} - t_j^*\right|,$$

$$\Delta i_{i\,max} = max_j\left|i_{ij} - i_j^*\right|,$$

$$\Delta f_{i\,max} = max_j\left|f_{ij} - f_j^*\right|,$$

for $i = 1, 2, \ldots, m$ and $j = 1, 2, \ldots, n$. Using the correlation coefficient $M_w\ (A_i, A^*)\ (i = 1, 2, \ldots, m)$, the ranking order of all alternatives and the best one(s) can be obtained.

4 | Methodology

This study was conducted with the participation of palliative care specialists in the city of Quito. The sample, consisting of 30 professionals, was randomly selected, including 19 nurses and 11 doctors associated with this work. The participants in this sample encompassed both genders and were aged between 28 and 46 years.

The objective of this study is to identify the essential ethical elements that should characterize palliative care professionals to ensure comprehensive, high-quality care for the patient. To achieve this purpose, neutrosophic correlation coefficients were used as an analytical tool. Furthermore, the same neutrosophic correlation approach was employed to determine the personality traits most significantly related to professional ethics in the execution of their work.

It is important to note that the most widely recognized neutrosophic pairs of personality Trait-antiTrait were particularly considered, as established in [16]. To carry out the selection of personality traits to be analyzed, an evaluation process was undertaken to identify those that have the greatest impact on the professional activities of specialists, generating repercussions for both the patients they attend to and their families. To make this selection of traits, three main criteria were critically considered, as shown in Figure 2.

Figure 2. Criteria evaluated for the selection of personality traits. Source: own elaboration.

The choice of these criteria was based on the premise that the selected personality traits should have a significant impact on the professional-patient relationship, ethical decision-making, and the well-being of family members in the context of palliative care. This allows for a more precise evaluation focused on the ethical and human aspects of healthcare in this field, contributing to the improvement of care quality and the

respect for fundamental ethical principles. For this case, each of the evaluated criteria is considered to have the same weight w_j =0.33.

To carry out the analysis of the personality traits of the professionals who underwent evaluation, the assistance of 5 highly qualified experts in the field of psychology was enlisted. To ensure rigorous and reliable results, 4 sessions of comprehensive clinical interviews were conducted using a specially designed neutrosophic questionnaire. This questionnaire was formulated to obtain responses in a format that considers the degree of truth (t), the degree of indeterminacy (related to uncertainty and lack of clarity), and the degree of falsehood (f) for each posed question. The collection and processing of these data were carried out meticulously, enabling the subsequent detailed evaluations of the personality traits of the analyzed professionals.

A similar analysis was conducted for the selection of ethical competencies linked to the optimal development of this activity. Literature review and brainstorming allowed for the compilation of an extensive list of skills necessary for the execution of this work. Neutrosophic correlation coefficients were used for screening among them, considering 1. Level of influence on the relief (physical, mental) of the patient; 2. Level of influence on the patient's family members; 3. Contribution to the quality of care; 4. Ethical contribution to the overall competence of the professional.

5 | Results

The application of correlation coefficients to assess and select personality traits with greater influence on the ethical aspects of palliative care for the examined professionals has yielded highly relevant results. These results are detailed in Table 1 after applying the procedure.

Table 1. Correlation coefficients calculated for personality traits. Source: own elaboration.

Personality traits analyzed	$\varphi 1$	$\varphi 2$	$\varphi 3$	$\mu 1$	$\mu 2$	$\mu 3$	$\psi 1$	$\psi 2$	$\psi 3$	***M Coeff.***
Self-esteem – Low Self-esteem	0.95	1	0.95	1	1	0.96	1	0.96	1	0.64
Kindness – Dislike	1	0.95	0.9	1	1	1	1	1	1	0.73
Caution – Impulsivity	1	1	0.8	1	0.96	0.87	1	1	1	0.58
Emotivism – Non-Emotivism	0.9	0.95	1	1	0.96	1	0.92	0.96	1	0.67
Sensitiveness – Insensitiveness	1	0.95	1	1	0.96	0.96	0.92	1	1	0.70
Flexibility – Rigidity	0.95	1	0.95	1	0.95	0.82	0.96	0.96	1	0.61
Extroversion – Introversion	1	1	0.8	1	0.96	0.87	0.96	1	1	0.56
Inhibition – Disinhibition	0.9	0.95	1	1	0.96	1	0.92	0.96	1	0.67
Honesty – Dishonesty	1	0.9	0.86	1	0.96	1	0.96	1	1	0.70
Perfectionism – Imperfectionism	0.78	1	0.83	0.87	1	0.96	0.92	1	1	0.58
Obsessionality – Non-obsessionality	0.78	0.94	1	0.95	1	0.91	1	0.96	1	0.61
Shyness – Boldness	0.95	0.95	1	0.95	1	0.91	1	0.96	1	0.65
Extroversion – Introversion	0.87	0.8	1	1	0.83	0.96	1	0.96	1	0.58
Conscientiousness – Unconsciousness	0.93	1	0.8	1	0.96	0.87	1	0.96	1	0.57

This methodological approach has precisely identified the personality traits that have a significant impact on the ethics of palliative care, according to expert experience, providing substantial value to the understanding of the influence of personality traits on ethical care in this healthcare area. The results in Table 1 reflect the correlations and relative importance of these personality traits in the context of the study.

Additionally, Table 2 presents the results derived from the analysis conducted to identify the fundamental competencies that should be present in professionals to provide ethical and appropriate care in the field of palliative assistance.

Table 2. Correlation coefficients calculated for the competitive ethical elements. Source: own elaboration.

Evaluated competencies	φ1	φ2	φ3	μ1	μ2	μ3	ψ1	ψ2	ψ3	M Coeff.
Ethics in end-of-life decision-making.	1	1	0.9	1	1	0.96	1	1	1	0.766
Family-centered care.	0.84	1	0.84	1	0.96	0.92	0.96	1	1	0.633
Ethics in pain and symptom management.	1	0.95	0.9	1	0.96	1	1	0.96	1	0.697
Shared decision-making.	0.9	0.95	1	1	0.96	1	1	0.96	1	0.697
Respect for the patient's autonomy.	0.84	1	0.89	0.87	1	0.96	0.96	1	1	0.599
Cultural sensitivity and diversity.	1	0.94	0.82	1	0.96	0.87	0.96	1	1	0.657
Equity and justice.	0.95	1	0.95	1	0.96	0.92	0.96	0.96	1	0.633
Effective communication.	0.94	1	0.89	0.91	1	1	1	0.96	0.9	0.558
End-of-life ethics.	1	0.95	0.95	0.96	1	0.96	1	1	1	0.612
Respect for the patient's values and wishes.	1	0.9	0.86	1	1	0.96	0.96	1	1	0.704

In this case, it was observed that Ethics in end-of-life decision-making, Ethics in pain and symptom management, and Respect for the patient's autonomy were the most preferred elements according to expert criteria.

Detailed evaluations were conducted in the analysis of the ethical aspects and personality traits of palliative care professionals. The results revealed that nurses exhibited a higher level of sensitiveness, with a value of 0.267, compared to doctors, whose level of sensitiveness was slightly lower, with a value of 0.184. This difference suggests that the evaluated nurses tended to be more sensitive to the needs and emotions of patients in the palliative care setting.

Regarding the trait-antiTrait Kindness-Dislike, it was observed that nurses obtained a value of 0.309, toward the threshold of the trait, while doctors obtained a value of 0.416. These results indicate that doctors may exhibit a higher degree of kindness or sympathy compared to nurses in this context.

However, concerning honesty, both groups of professionals, both nurses and doctors, showed similar levels, with a large majority located in the threshold of uncertainty (see Figure 1). Nurses obtained a value of 0.394, while doctors obtained a value of 0.386. This suggests that honesty is a consistently shared trait between both groups in the context of palliative care, without being an extremely persistent or lacking trait in either group.

In the analysis of ethical aspects and personality traits in palliative care professionals, several significant results were obtained. Regarding respect for the patient's wishes, both groups of professionals, both nurses and doctors, showed high ethical levels. However, a slight superiority was noted in the average of nurses in this aspect. This suggests that nurses may be slightly more sensitive and attentive to the wishes of patients compared to doctors. Ethics in pain management was high in both groups and remained almost constant, indicating that both groups performed ethically in managing the pain and symptoms of patients, without significant differences.

Regarding ethics in end-of-life decision-making, doctors were observed to have slightly higher values compared to nurses. This could suggest that doctors are more ethically inclined to address difficult decisions at the end of patients' lives.

Additionally, an interesting relationship was observed between the traits of sensitiveness and ethics in end-of-life decision-making, as well as respect for the values and wishes of the patient. Professionals located primarily at the threshold of the sensitiveness trait tended to exhibit higher ethical values in these aspects, emphasizing the importance of sensitivity in the ethical care of patients in palliative settings.

On the other hand, professionals with higher averages in the kindness trait showed better ethical management in relation to pain and symptoms. This highlights how kindness can contribute to an ethical approach to handling the physical and emotional aspects of patients. No significant relationships were found between

honesty averages and the analyzed variables, suggesting that honesty did not significantly influence the ethical aspects examined in this study. This could be due to the large number of professionals located in the threshold of indetermination.

6 | Conclusions

This study allowed for the identification of essential ethical elements characterizing professionals in palliative care, employing neutrosophic correlation coefficient-based analysis. Additionally, this ap-proach was used to determine the most significant personality traits related to professional ethics in this field. Special attention was given to the more widely recognized neutrosophic pairs of personality Trait-antiTrait, considering three critical criteria for selecting traits to analyze.

It was observed that professionals with higher averages in the sensitiveness trait showed slightly higher averages in ethics in end-of-life decision-making and respect for the values and wishes of the pa-tient. Furthermore, those with higher averages in the kindness trait better managed the ethical aspects related to pain and symptoms. The incorporation of neutrosophic personality traits in the assessment of ethics in palliative care provides a valuable tool for identifying and understanding the factors influenc-ing ethical care in critical health situations.

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Author Contributaion

All authors contributed equally to this work.

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Data Availability

The datasets generated during and/or analyzed during the current study are not publicly available due to the privacy-preserving nature of the data but are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that there is no conflict of interest in the research.

Ethical Approval

This article does not contain any studies with human participants or animals performed by any of the authors.

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