

Neutrosophic Evaluation of Patient-Centered Care in Ecuador

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Abstract. The perception of Ecuadorian patients about medical care and the implementation of Patient-Centered Care (PCC) is a topic of profound relevance in the current health system. Lack of effective communication, variability in experiences, and lack of awareness are some of the deficiencies that influence patients' perceptions and criteria. In this context, the general objective of this neutrosophic evaluation is to identify the positive and negative aspects of PCC, as well as the perception of patients. The results revealed that the Personal Experience (PE) of the patients is a predominant factor in the acceptance of PCC. Positive experiences, such as effective communication and active participation in health decisions, generated positive perceptions. The conclusions highlight the need to improve communication, education, and institutional support to promote patient-centered care in Ecuador and address the indeterminacies present in the general perception.

Keywords: Patient-Centered Care, Healthcare, Neutrosophic Analysis.

1 Introduction

The perception of Ecuadorian patients about the medical care received can vary significantly from one individual to another and can be evaluated using the neutrosophy methodology, which involves the degrees of truth, indeterminacy, and falsehood. It is significant to note that the perception of medical care may depend on individual factors [1], such as personal experience, prior expectations, interactions with medical staff, and specific health circumstances [2]. Therefore, Ecuadorian patients' perceptions of the medical care received can vary widely in terms of neutrosophic degrees of truth, indeterminacy, and falsity. Hence more detailed and specific research is essential to obtain a complete picture of these perceptions and expectations in the Ecuadorian population (see Table 1).

Table 1: Perception of Ecuadorian patients about PCC. Source: own elaboration.

Degree of Truth	Degree of Indeterminacy	Degree of Falsehood
Satisfaction and trust: Some Ecuadorian patients may experience highly satisfactory and effective medical care. They may feel that health professionals are competent and care about their well-being. These patients trust the healthcare system and believe their needs are adequately addressed [3].	Mixed experiences: A considerable group of Ecuadorian patients may have mixed experiences in healthcare. They may have had positive experiences with certain doctors or health departments, but also face challenges at other times. This could be due to factors such as variability in quality of care, wait times, and variable communication between patients and doctors.	Dissatisfaction and mistrust: Some Ecuadorian patients may have a negative perception of medical care. They may feel that they are not given enough attention, that they are treated impersonally, or that their concerns are not taken seriously. These patients may experience significant levels of dissatisfaction and distrust in the healthcare system.
Positive opinions: They can express positive opinions about the medical care received, highlighting the empathy of the doctors, the quality of clinical care, and the ease of access to health services [4]. For	Variable expectations: Perception of medical care may somehow depend on patients' prior expectations. Those with more realistic or low expectations may rate their experience with a degree of indeterminacy, as they may accept certain	Persistent complaints and problems: They may have persistent complaints about the quality of care, problems accessing medical services, or barriers to communication with health care providers. Their perception could

Degree of Truth	Degree of Indeterminacy	Degree of Falsehood
them, patient-centered care is a reality, and the perception of it could be rated with a high degree of truth.	deficiencies as part of overall medical care.	be described as highly false in terms of satisfaction and quality of care.

Regarding the analysis of the effectiveness of the implementation of Patient-Centered Care (PCC) in Ecuador, the use of neutrosophic degrees is required. So that the obstacles that may limit successful implementation in the Ecuadorian health system could be examined (see Table 2).

Table 2: Obstacles that limit the implementation of the PCC in Ecuador. Source: own elaboration.

Obstacles	Degree of Truth	Degree of Indeterminacy	Degree of Falsehood
Cultural factors	There are significant cultural differences in Ecuador, where some communities may have a more paternalistic mentality in healthcare, which may hinder the adoption of PCC.	Cultural perception can vary from region to region and ethnic group to ethnic group, contributing to uncertainty as to how these differences influence the application of PCC.	Cultural resistance to PCC, in some cases, can be a real obstacle that limits its successful implementation.
Limited resources	The lack of financial resources and infrastructure in the Ecuadorian health system is a well-documented obstacle to the successful implementation of PCC.	The lack of resources may vary by region and health institution, leading to a degree of indeterminacy in terms of its exact impact on PCC.	Lack of adequate resources can be a significant barrier that limits the effective implementation of PCC.
Training of medical staff [5]	The lack of adequate training of medical staff in patient-centered approaches can be a real obstacle to PCC in Ecuador.	The quality of medical training can vary, contributing to indeterminacy regarding staff readiness to adopt PCC.	Lack of training can be a major limitation impeding successful implementation of PCC.
Bureaucracy and regulation	Bureaucracy and regulation in the healthcare system can make it difficult to adopt more flexible, patient-centered approaches.	The complexity of the regulation and its impact on the PCC can vary, contributing to indeterminacy in terms of its exact influence.	Excessive bureaucracy and restrictive regulation can be significant obstacles to the effective implementation of PCC.

In summary, the neutrosophic analysis reveals that the application of PCC in Ecuador faces multiple barriers and challenges. Cultural factors, limited resources, inadequate training of medical staff, and bureaucracy in the health system are obstacles that may vary in their impact, but in many cases represent real limitations for the successful implementation of PCC in the country. Addressing these barriers requires specific strategies and a personalized approach for each region and healthcare context in Ecuador. Therefore, the main objective of this study is:

- Evaluate the acceptance of Patient Centered Care, by identifying the positive and negative aspects and the perception of users.

Specific objectives:

- Determine the factors that affect the analyzed variable.
- Carry out measurement and modeling of the variable through neutrosophic analysis.
- Project potential solutions based on the factor with the greatest impact on the variable.

It is essential to recognize that the perception of medical care is highly subjective and can be influenced by individual, cultural, and contextual factors. To fully understand these neutrosophic degrees and improve patient-centered healthcare in Ecuador, it is necessary to conduct specific studies that include surveys, interviews, and qualitative analyses to capture the diversity of patient experiences and expectations in the Ecuadorian healthcare system. To achieve a complete result, the neutrosophic IADOV method is used to evaluate PCC in Ecuador.

2 Materials and methods

2.1 Neutrosophic Iadov

To apply the neutrosophic Iadov technique, experts must rely on a linguistic evaluation system that shows the expert's opinion. This system and its neutrosophic and numerical equivalents are shown in Table 3.

Table 3: Evaluation system for experts. Linguistic terms are associated with their neutrosophic evaluation and score value. Source: own elaboration.

Linguistic term	SVNU	Scale
Clearly satisfied	(1,0,0)	3
More satisfied than dissatisfied	(1,0.35,0.35)	2.3
Undefined	I	1.5
More dissatisfied than satisfied	(0.35,0.35,1)	1
Clearly dissatisfied	(0,0,1)	0
Contradictory	(1,0,1)	2

The term I in neutrosophy is interpreted as a unit of indeterminacy. Another component of the method is Iadov's Logical Table, which assigns numerical values to three closed questions that are applied to the experts (see Table 4). If necessary, open questions can be applied in the surveys.[6]

Table 4: Closed questions and their corresponding values. Source: own elaboration.

Approaches	Possible answers								
	Yes			I don't know			No		
1st QUESTION	Yes	I don't know	No	Yes	I don't know	No	Yes	I don't know	No
2nd QUESTION									
3rd QUESTION									
I like it a lot	1	2	6	2	2	6	6	6	6
I do not like it very much	2	3	3	2	3	3	6	3	6
I do not care	3	3	3	3	3	3	3	3	3
I dislike it more than I like it	6	3	6	3	4	4	3	4	4
It is an unconsolidated research process	6	6	6	6	4	4	6	4	5
I don't know what to say	2	3	6	3	3	3	6	3	4

To survey the level of satisfaction of the experts, the neutrosophic Iadov technique was used. This technique is based on the use of Single-Valued Neutrosophic Sets (SVNS) associated with linguistic variables for their ability to increase interpretation in recommendation models and the use of indeterminacy.[7]

The definition of SVNS is as follows, Let X be a universe of discourse. An SVNS A over X is an object of the form.

$$A = \{[x, u_a(x), r_a(x), v_a(x)]: x \in X\} \quad dA = \{[x, u_a(x), r_a(x), v_a(x)]: x \in X\}d \tag{1}$$

Where:

$$u_a(x): X \rightarrow [0, 1], r_a(x): X \rightarrow [0, 1] \text{ y } v_a(x): X \rightarrow [0, 1]$$

With

$$0 \leq u_a(x), r_a(x), v_a(x) \leq 1, \forall x \in X$$

For convenience, a Single Value Neutrosophic Number (SVNN) will be expressed as:

$$A = (a, b, c), \text{ where } a, b, c \in [0,1] \text{ and it satisfies } 0 \leq a + b + c \leq 1.$$

Aggregation operators are used to find an SVNS that describes several sets at the same time. One of these operators is the neutrosophic weighted average (WA), which is defined as follows:

Let $\{A_1, A_2, \dots, A_n\} \in SVNS(x)$, where $A_j = (a_j, b_j, c_j) (j = 1, 2, \dots, n)$, the Neutrosophic Weighted Average (WA) Operator is calculated as:

$$WA(A_1, A_2, \dots, A_n) = \sum_{i=1}^n [w_j, A_i] \tag{2}$$

Where:

$$WA(w_1, w_2, \dots, w_n) = \sum_{i=1}^n [w_j, A_i] \text{ is the vector of } A_j (j = 1, 2, \dots, n) \text{ such that } w_n \in [0,1] \text{ y } \sum w_j = 1$$

To deneutrosophicate this set so that a single value is obtained, a scoring function is usually used [8].

Let $A = (a, b, c)$, the S-score function of an SVNS, based on the indeterminate membership degree and the false membership degree, is defined by the following equation:

$$S(A) = 2 + abc \tag{3}$$

To use an SVNS to measure individual satisfaction, this value must be associated with a linguistic variable. Therefore, the scales shown in Table 3 were specified and the corresponding score was calculated using (3)

For cases in which the evaluation corresponds to indeterminacy (not defined) (I), a process was developed.

$$\lambda([a_1, a_2]) = \frac{a_1 + a_2}{2} \tag{4}$$

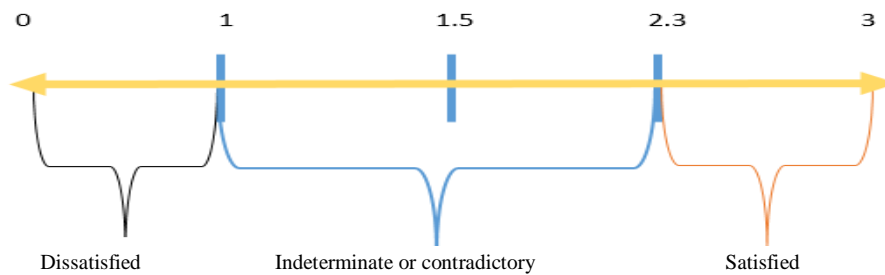
To calculate the Respondents' Global Satisfaction Index (ISG), the WA aggregation operator (2) was used, taking into consideration the score values and that all respondents have the same weight, so

$$w_i = \frac{1}{n}$$

The instrument designed for the application of the survey was a five-question questionnaire, three of which are closed (1, 3, and 5) and two are open (2 and 4). The three closed questions were related through the “Logical Iadov Chart”, which is presented in Table 4. The algorithm used for the application of the neutrosophic Iadov technique is the following:

- Once the questionnaire has been applied, the corresponding value (from 1 to 6) for the satisfaction classification of the surveyed experts is calculated in the three-entry IADOV logical table.
- The linguistic variable, the SVNS, and the score are matched to this value according to Table 2.
- The score value of each respondent is used to calculate the group satisfaction index (GSI) from the aggregation of all scores using the WA aggregation operator formula (2).
- The GSI is interpreted from the location of the value on the graph in Figure 1.

Figure 1: Scale for determining the level of satisfaction according to the scores used. Source: own elaboration.



2.2 Data collection

Additionally, for statistical processing, the following formula was used to calculate the sample size:

$$n = \frac{Z^2 N p q}{E^2 (N - 1) + Z^2 p q} \tag{5}$$

Where: n: is the ample size, Z: is the value of the normal distribution with the assigned confidence level, E: is the desired sampling error, and N: is the population size.

3 Results

Data collection: For the study, the sample size of respondents is calculated using equation 5, which takes the probabilities as 50% or 0.05, according to the following results:

Maximum margin of error allowed=10.0%

- Population size=200
- Size for a 95% confidence level65
- Size for a 97% confidence level74
- Size for a 99% confidence level91

It is decided to work with 95% confidence, so surveys are applied to determine the level of the analyzed variable. To do this, the criteria of 65 respondents are evaluated per factor.

To do this, the criteria of 65 respondents are evaluated by a group of experts in health, social communication,

PCC, psychology, law, and organizational culture. From the sample, it was decided to identify the neutrosophic variable, the coding for the modeling, and the neutrosophic states in which they are found (see Table 5).

Table 5: Characteristics of the variable. Source: own elaboration.

Variable	Coding	Sample	neutro- sophic set	Scale [0 ; 1], $\forall F_n$
<i>Acceptance of Patient Centered Care (PCC) in Ecuador</i>	A-PCC	80	<i>Satisfaction and acceptance of the Ecuadorian health system</i>	<p>[1 ; 0; 0] (Truth): On this scale, there is a complete and effective acceptance of the PCC in Ecuador. The positive aspects of PCC, such as improved doctor-patient communication, shared decision-making, and user satisfaction, are clearly evident and widespread. Health professionals apply it effectively, and users rate it positively.</p> <p>[0; 1; 0] (Indeterminacy): This scale represents the uncertainty and variability in the acceptance of the PCC in Ecuador. There is a mix of positives and negatives, and user perception can vary widely. Some professionals and health centers can apply it effectively, while others may have difficulties or inconsistencies in its implementation. Users may have mixed opinions about their experience with PCC.</p> <p>[0; 0; 1] (Falsehood): On this scale, PCC is not widely accepted in the Ecuadorian health system. The negative aspects can outweigh the positives, resulting in a lack of adoption and effective implementation of PCC. Users may have negative perceptions and feel that their expectations in terms of patient-centered care are not met.</p>

The neutrosophic variable A-PCC in Ecuador is aimed at patient satisfaction with the service received from the Ecuadorian health system. The evaluation of each element of origin and its relationship between the factors and the subset must be analyzed to decide on a possible diagnosis within the neutrosophic set called satisfaction and acceptance of the Ecuadorian health system (Table 6) [9] [10-13-14].

Table 6: Factors that influence A-PCC. Source: own elaboration.

Code	Factor	Source elements	Relationship between factor and the source element	Observations
F1	Awareness and understanding (AU)	<ul style="list-style-type: none"> • Patient awareness, • Patient understanding, • Health education, doctor-patient communication 	Degree of CC in relation to patients' perception of PCC.	Influence on patients' perception of PCC based on their understanding and awareness of PCC principles.
F2	Personal experience (PE)	<ul style="list-style-type: none"> • Positive experiences, • Negative experiences with PCC 	Degree of PD in relation to patients' perception of PCC	Impact of patients' personal experiences on their perception of PCC, with positive experiences and negative experiences.
F3	Training of medical personnel (TMP)	<ul style="list-style-type: none"> • Training level of medical personnel, • Continuing education 	Degree of TMP in relation to the implementation of the PCC	Importance of training medical personnel in the effective implementation of PCC, with a high degree of TMP that promotes the adoption of patient-centered approaches.
F4	Resources and Support (RS)[11]	<ul style="list-style-type: none"> • Availability of resources, • Institutional support 	Degree of RS in relation to the implementation of the PCC	Importance of resources and institutional support in the promotion and adoption of PCC, with a high degree of RS that facilitates implementation.
F5	Organizational culture (OC)	<ul style="list-style-type: none"> • Culture of the institution, • PCC prioritization 	Degree of OC in relation to the implementation of the PCC	Influence of the organizational culture in hospitals and health centers on the promotion of PCC, with a positive culture that encourages its adoption [12].

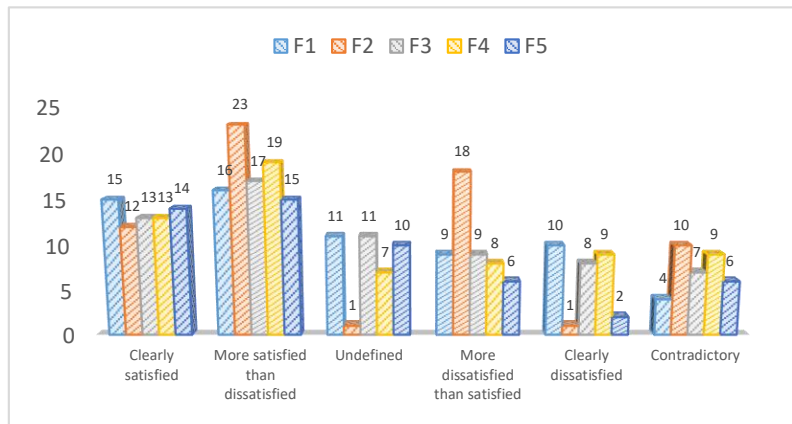
For the development of the neutrosophic IADOV method, questions are proposed for the evaluation of each factor by group. Among these, there are three closed questions and two open questions that stand out for modeling the method according to the neutrosophic scale and the previously proposed questionnaire (see Table 7).

Table 7: Open and closed questions in the questionnaire. Source: own elaboration.

No.	F1	F2	F3	F4	F5
1 (question 1 of the questionnaire)	Do you believe that the principles and benefits of PCC affect patients' satisfaction and acceptance of the Ecuadorian health system?	Do you think patients' personal experience with medical care influences their perception of PCC?	Do you think that the training of medical personnel influences their perception of the PCC and acceptance of the Ecuadorian health system by patients?	Do you believe that available resources and institutional support are essential to implement PCC with a high degree of acceptance?	Do you think that the organizational culture in hospitals and health centers can significantly affect the perception of PCC?
2 (question 2 of the questionnaire)	Do you think that the Ecuadorian health system should work on patients' perceptions of PCC?	Do you consider that the Ecuadorian health system should work on the elements that influence the negative experience in the perception of PCC by patients?	Do you consider that the Ecuadorian health system should work to achieve medical personnel trained in PCC?	Do you consider that the Ecuadorian health system should work to provide available resources and institutional support to achieve satisfactory PCC?	Do you consider that the Ecuadorian health system should work to achieve an organizational culture in hospitals and health centers that values and promotes PCC?
3 (open question)	What is your opinion about the principles and benefits of PCC?	What is your personal experience with the PCC?	What is your opinion about the training and professionalism of the medical staff at PCC?	What is your opinion about the resources and support that health institutions have to adopt PCC?	What is your opinion about the organizational culture in hospitals and health centers?
4 (open question)	What do you dislike most about the medical health system regarding PCC principles?	What do you dislike most about the medical health system regarding PCC principles?	What do you dislike most about the medical staff at PCC?	What deficiencies have you detected in health institutions regarding the resources available for patient care?	What deficiencies have you observed in healthcare institutions that indicate a culture that does not prioritize patient-centered care?
5 (question 3 of the questionnaire)	Would you like to know and understand the principles and benefits of PCC?	Would you like to know and understand the principles and benefits of PCC?	Would you like health professionals in Ecuador to be adequately trained in PCC?	Would you like healthcare institutions to have the medical resources and institutional support to adopt successful PCC?	Would you like health institutions to foster an organizational culture that values and promotes PCC?

From the application of the survey by the group of experts, the results were obtained regarding the individual satisfaction levels shown in Figure 2 and the information regarding the neutrosophic group studied.

Figure 2: Satisfaction levels of the group of experts for each factor.



Positive satisfaction levels can be seen, satisfaction and acceptance of the Ecuadorian health system regarding A-PCC, with predominance in the degree to which Ecuadorian patients are aware and understand the principles and benefits of PCC. However, dissatisfactions are observed especially in patients' personal experience with medical care and perception of PCC. Indeterminate and contradictory positions were also found between the level of membership of each element.

The calculations of the GSI according to the frequency of observation and the individual satisfaction indices of the designed categories and their corresponding scores are shown in tables 8 to 12, for each group respectively.

Table 8: Calculation of the Group Satisfaction Index (GSI) of the *awareness and understanding* element.

Linguistic term	SVNU	Scoring	Frequency	F*S	(F*S)/n
		(S)	(F)		
Clearly satisfied	(1;0;0)	3	15	45	0.69
More satisfied than dissatisfied	(1;0.35;0.35)	23	16	36.8	0.57
Undefined	I	1.5	11	16.5	0.25
More dissatisfied than satisfied	(0.35; 0.35;1)	1	9	9	0.14
Clearly dissatisfied	(0;0;1)	0	10	0	0.00
Contradictory	(1;0;1)	2	4	8	0.12
Group Satisfaction Index					1.77

From the analysis of the *awareness and understanding* element, it can be seen that patients are aware of and understand the principles and benefits of PCC. Although there is an undefined degree regarding patients who are unaware of the extent of PCC. Finally, a group satisfaction index of 1.77 is defined for the factor analyzed.

Table 9: Calculation of the Group Satisfaction Index (GSI) of the *personal experience* element.

Linguistic term	SVNU	Scoring	Frequency	F*S	(F*S)/n
		(S)	(F)		
Clearly satisfied	(1;0;0)	3	12	36	0.55
More satisfied than dissatisfied	(1;0.35;0.35)	2.5	23	57.5	0.88
Undefined	I	1.5	1	1.5	0.02
More dissatisfied than satisfied	(0.35; 0.35;1)	1	18	18	0.28
Clearly dissatisfied	(0;0;1)	0	1	0	0.00
Contradictory	(1;0;1)	2	10	20	0.31
Group Satisfaction Index					2.05

The analysis of the element of *patient's personal experience* with medical care influences their perception of the PCC: more satisfied than dissatisfied and more dissatisfied than satisfied. Therefore, a degree of contradiction is reflected between the responses of this factor. There is an existing level of indeterminacy. With this, patients have had positive experiences with PCC, which increases their acceptance. On the other hand, a high degree of negative *personal experience* would indicate that they may decrease acceptance. Finally, a group satisfaction index of 2.05 is defined for the factor analyzed.

Table 10: Calculation of the Group Satisfaction Index (GSI) of the *training of medical personnel* element.

Linguistic term	SVNU	Scoring	Frequency	F*S	(F*S)/n
		(S)	(F)		
Clearly satisfied	(1;0;0)	3	13	39	0.60
More satisfied than dissatisfied	(1;0.35;0.35)	2.5	17	42.5	0.65
Undefined	I	1.5	11	16.5	0.25
More dissatisfied than satisfied	(0.35; 0.35;1)	1	9	9	0.14
Clearly dissatisfied	(0;0;1)	0	8	0	0.00
Contradictory	(1;0;1)	2	7	14	0.22
Group Satisfaction Index					1.86

Of the criteria analyzed regarding the *training of medical personnel* element, it can be observed that patients are more satisfied than dissatisfied; it can be said that there is a certain undefined degree to which work should be done. Therefore, attention should be paid to the work with health professionals so that they are adequately trained, which would facilitate a level of satisfaction in the acceptance of PCC in Ecuador.

Table 11: Calculation of the Group Satisfaction Index (GSI) of the *resources and support* element.

Linguistic term	SVNU	Scoring	Frequency	F*S	(F*S)/n
		(S)	(F)		
Clearly satisfied	(1;0;0)	3	13	39	0.60
More satisfied than dissatisfied	(1;0.35;0.35)	2.5	19	47.5	0.73
Undefined	I	1.5	7	10.5	0.16
More dissatisfied than satisfied	(0.35; 0.35;1)	1	8	8	0.12
Clearly dissatisfied	(0;0;1)	0	9	0	0.00
Contradictory	(1;0;1)	2	9	18	0.28
Group Satisfaction Index					1.89

Of the *resources and support* element, it can be seen that, although patients are on the balance between more satisfied than dissatisfied. It can be said that there is a certain degree of patients accepting that there are adequate resources in health facilities, although work should be done to achieve solid institutional support that facilitates the implementation of PCC. A group satisfaction index of 1.89 is defined for this factor.

Table 12: Calculation of the Group Satisfaction Index (GSI) of the *organizational culture* element.

Linguistic term	SVNU	Scoring	Frequency	F*S	(F*S)/n
		(S)	(F)		
Clearly satisfied	(1;0;0)	3	14	42	0.65
More satisfied than dissatisfied	(1;0.35;0.35)	2.5	18	45	0.69
Undefined	I	1.5	11	16.5	0.25
More dissatisfied than satisfied	(0.35; 0.35;1)	1	8	8	0.12
Clearly dissatisfied	(0;0;1)	0	7	0	0.00
Contradictory	(1;0;1)	2	7	14	0.22
Group Satisfaction Index					1.93

As for the *organizational culture* element, there is an organizational culture in hospitals and health centers. However, it is not entirely defined that it significantly achieves the perception of PCC. The governing entities must work to achieve an organizational culture that meets the proposed standards to achieve patient satisfaction and acceptance of the Ecuadorian health system. A group satisfaction index of 1.93 is defined for this factor.

When analyzing the proposed neutrosophic factors in relation to the neutrosophic variable "Acceptance of Patient-Centered Care (PCC) in Ecuador", it can be argued that the neutrosophic factor that most affect the states of this variable and, therefore, in the perception of Ecuadorian patients about medical care, it is the "Personal Experience (PE)" Factor. The reason behind this choice is that patients' personal experience in their interaction with the health system and medical professionals has a direct and significant impact on their perception of PCC. This experience can be both positive and negative and can greatly influence how patients value and accept PCC in their healthcare. Regarding the result obtained from the *personal experience* factor, it is detailed that:

- Positive experiences (degree of truth): When patients have positive experiences with PCC, such as feeling they are heard, involved in decision-making, and well cared for, they tend to have a highly positive perception of PCC. This may lead to greater acceptance and promotion of this form of care.
- Negative Experiences (Degree of Falsehood): On the other hand, negative experiences, such as feeling ignored, misinformed, or treated impersonally, can lead to a negative perception of the PCC. Patients

who have had bad experiences may be less likely to accept or trust patient-centered approaches.

- **Variability in Experiences (Degree of Indeterminacy):** Variability in patients' personal experiences with PCC creates indeterminacy in overall perception. Some patients may have had positive experiences, while others may have had negative or mixed experiences. This contributes to an overall indeterminate perception of the PCC.

Given that the perception of PCC in Ecuador depends largely on the personal experiences of patients, the neutrosophic factor "Personal Experience (PE)" is the most influential in the states of the neutrosophic variable "Acceptance of Patient-Centered Care (PCC) in Ecuador". Therefore, understanding and improving these personal experiences is essential to promote the successful adoption of PCC and improve healthcare in the country.

To positively enhance the predominant factor "Personal Experience (PE)" in the states of the neutrosophic variable "Acceptance of Patient-Centered Care (PCC) in Ecuador" and improve the perception of Ecuadorian patients about medical care, proposals for solutions can be developed based on neutrosophy that address both the positive aspects and the existing indeterminacies. Among the proposed solutions are:

Improving doctor-patient communication (degree of truth):

- **Promoting communication skills:** Provide ongoing training to healthcare professionals in effective communication skills, including active listening and empathy, to ensure patients feel heard and understood.
- **Promotion of shared decision-making:** Encourage shared decision-making between doctors and patients, where treatment options are discussed, and patients' preferences and values are respected.

Problem-solving (degree of indeterminacy):

- **Continuous evaluation:** Conduct regular evaluations of patient satisfaction and experiences to identify specific areas for improvement and address existing indeterminacies in the perception of PCC.
- **Patient feedback and active participation:** Encourage patient feedback and active participation in improving healthcare processes to address individual concerns and needs.

Focus on patient satisfaction (degree of truth):

- **Implementation of satisfaction surveys:** Conduct regular patient satisfaction surveys to objectively measure the quality of care and use the results to make targeted improvements.
- **Awards and Recognition:** Recognize and reward hospitals and healthcare professionals who demonstrate exceptional commitment to PCC and patient satisfaction.

Institutional support (degree of truth):

- **Committed leadership:** Foster committed leadership with PCC in health institutions to establish a culture of patient-centered care from senior management.
- **Allocation of adequate resources:** Ensure that sufficient resources, both financial and personnel, are allocated to support the effective implementation of the PCC.

Education and public awareness (degree of truth):

- **Patient education programs:** Implement patient education programs that inform patients about their rights, responsibilities, and the importance of PCC in health decision-making.
- **Awareness campaigns:** Conduct public awareness campaigns about PCC and its benefits, targeting both patients and healthcare professionals, to create a stronger understanding of this approach.

These neutrosophic solutions directly address the "personal experience (PE)" factor and work with both the positive aspects and the existing indeterminations in the perception of PCC in Ecuador. By improving communication, problem-solving, focusing on patient satisfaction, providing institutional support, and promoting education and public awareness, a satisfactory degree of acceptance of Patient-Centered Care can be achieved and health care improved in the country. It is essential that these solutions are implemented continuously and adapted to the specific needs and characteristics of the Ecuadorian health system.

Conclusion

Patients' personal experience in their interaction with the health system and medical professionals is a critical factor that influences how they perceive Patient-Centered Care (PCC) in Ecuador. The results of the neutrosophic analysis reveal that positive experiences, such as effective communication and participation in decision-making, are associated with greater acceptance of PCC, while negative experiences may decrease this acceptance. The variability in these experiences contributes to the indeterminacy in overall perception.

Improving doctor-patient communication and education, for both patients and health professionals, are essential elements to promote the acceptance of PCC. The results of the neutrosophic IADOV support the need for effective communication and active participation of patients in their care as factors that increase the positive perception of PCC.

The results obtained provide a rigorous and multidimensional approach to understand the perception of PCC

in Ecuador. This approach allows capturing the complexity of the variable "acceptance of PCC", considering both the positive aspects and the indeterminacies present in the patient's perception. This, in turn, facilitates the identification of specific areas of improvement and the formulation of more precise strategies to encourage the adoption of PCC and improve healthcare in the country.

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