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Assessment of the Relevance of Intercultural Medical Care. Neutrosophic sampling

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Abstract. The research addresses aspects related to intercultural medical care, considering that methodological limitations affect the performance of medical care in Ecuador. The objective of this study was to carry out a diagnosis on the level of relevance of medical care personnel regarding interculturality in health, with a sample calculated using neutrosophic statistics , which covered different specialties. The research uses methods of a theoretical order (analytical-synthetic, inductive-deductive, and systemic) and the empirical level (the survey) and mathematical statistics. The information was submitted to the corresponding statistical processing. The results obtained in the practical validation of the assessment of the relevance of intercultural medical care, since through the Pearson correlation test, it was confirmed the existence of significance.

Keywords: healthcare, medicine, intercultural, diagnosis, neutrosophic statistics

1 Introduction

Culture is considered a continuous process of production, reproduction, creation, and exchange of human work with its multiple manifestations. It is a process where man embodies his essential being and (…) projects the future, based on the recognition of the possibilities and limits in which his creative energy is deployed (…)". That is why the sociocultural term is related today, mostly, with various cultural, intellectual, and social products [1].

Following the above-mentioned, it can be approached that the term culture and its different ramifications can be used in different fields of knowledge. Therefore, this research will delve into one of the derivations of this, in a specific context such as the case of health.

The relationship of different cultures in a given context of power implies considering different levels: the interpersonal, the group, and the structural. That is why there must be a direct relationship between interculturality and health. Well, the current ways of approaching treatments present a scientific perspective. However, it should not be forgotten that until recently, the ancestral and traditional forms of treatment were the only ways to cure the diseases of many indigenous communities. That is why health systems personnel must seek a link or awareness of why the treatment is required.

Within this science, the intercultural concept is not sufficiently incorporated into the tasks of the different health systems of the Latin American region, it has a rich history and culture in the traditions of its ways of treating different diseases. This diversity translates into the ever-increasing employment of traditional health agents with knowledge inherited over generations, and with a very high level of use by patients treated in the National Health Systems.

According to the World Health Organization, the definition of Intercultural Health is related to the universality of some processes in countries belonging to the Far East or Africa and is understood from respect for different cultures and the interaction with agents of traditional medicine [2].

From the perspective of several knowledgeable researchers on the subject, they suggest that intercultural health is a fact, it is necessary for the real and non-supervised participation of the true social actors of the communities. What must also go hand in hand with scientific and systematized knowledge in medical care.

A special look requires that in several Latin American countries, traditional medicine has a great presence and is used by a vast majority of the population that had in this knowledge a single health resource until not long ago, as argued by Bautista Vangehuchten, & Duque, 2017. Hence the importance and timeliness of deepening studies of this nature [3].

In the Republic of Ecuador, in 2008 it was possible to approve and apply the constitutional regulations that

recognize the struggle of groups historically segregated by the socio-political and until then mono-cultural system of the State, empowering social participation and interculturality. Different areas of public management where health is involved.

Most of the authors consulted because the elderly are the main age group that still maintains knowledge about medicinal plants, rituals, and traditional healing methods. Many of them also have experience as midwives and healers. However, it is common to hear their concern that the intergenerational transmission of this knowledge is lost, because currently few young people are interested in learning and practicing them [4].

In contrast, it is observed that traditional practices are not sufficiently valued by rural doctors or by other professionals hired by the Ministry of Public Health, since medical procedures and the use of drugs are prioritized over the application of traditional methods in minor illnesses [4].

The policies, plans and actions that are projected by medical care, go through several essential factors, these are disease and health as a universal right. Which are decisive for the success or failure of the treatment. For the first to be achieved, it is necessary to assess the two essential actors. The healthcare professional and the patient receiving the care.

Due to the characteristics of the Ecuadorian geography, health personnel must move long distances or go to places with difficult access, to provide comprehensive care to users of the health service. That is why ancestral knowledge and interculturality can be used to achieve an articulation between both pieces of knowledge [5].

It is an unequivocal example of the importance of promoting research on interculturality in health. Well, it allows overlapping of knowledge to achieve a better quality of life for the Ecuadorian population.

According to what was previously discussed in this work, it is intended to make a diagnosis of intercultural medical care. For which an exploratory diagnosis was made.

These results make it possible to identify the current prevailing scenario and the following problematic situation: how to identify the level of relevance of medical care personnel regarding interculturality in health?

That is why the present work has the objective: to make a diagnosis on the level of relevance of medical care personnel on interculturality in health.

Therefore, the following hypothesis is raised: knowledge about the assessment of the relevance of intercultural medical care will allow the medical treatment of various diseases to be carried out more effectively.

2 Materials and Methods

2.1 Subjects under study

Neutrosophic statistics were used to calculate the population. As the total population is known, it is calculated using the following expression:

$$n = \frac{N * Z_{\alpha}^{2} p * q}{d^{2} * (N-1) + Z_{\alpha}^{2} * p * q} \quad (1)$$

Where p = means the approximate proportion of the phenomenon under study in the reference population, while q = represents the proportion of the reference population that does not present the phenomenon under study (1 -p). The desired confidence level is indicated by the letter (Z). These, in turn, refer to the degree of confidence that the true value of the parameter in the population will be found in the calculated sample, while the absolute precision is (d). Which is nothing more than the desired width of the confidence interval on both sides of the true value of the difference between the two proportions (in percentage points). N is population size.

In this case, you want a confidence level of 95%, z = 1.96, d = 0.05 and p = 0.44, N =[30, 36].

Calculations on the neutrosophic sample were made on Google Collaboratory using python interval arithmetic library.

The result that we call the neutrosophic sample n = [27.46, 33.44] indicates that the sample must be in values between 27 and 33 individuals. This value is de-neutrosophicated using:

$$\lambda([a_1, a_2]) = \frac{a_1 + a_2}{2} = \frac{27+33}{2} = 30 \quad (2)$$

Being consistent with the formulas of neutrosophic statistics for the population calculation, in this research, a total of 30 professionals from different branches of the health sciences are studied. Table 1 shows these and the amount for each of them, the sex and the average age of the sample under study. A simple random sampling was used for its selection, using the technique of selection by random numbers.

Specialty (N)	Male gender	Female gender	Age (mean ± SD)
Medicine (16)	7	9	39.1 ± 11.6
Nursing (7)	5	2	44.7 ± 11.2
Laboratory workers (4)	1	3	42.6 ± 10.1
Rehabilitators (2)	1	1	46.5 ± 9.2
TOTAL (30)	15	15	44.3 ± 10.8

Table 1. Characteristics of the sample studied by medical specialty, sex and age. **Source**: results of the sample study.

2.2 Type of investigation

A quantitative and cross-sectional pilot study was carried out. It is based on non-experimental research since there was no manipulation of the variables. The data are interpreted as they were revealed in the context of the application, a question that allows a photographic assessment of it.

2.3 Instruments

For the development of the study, a set of methods were used, both theoretical and empirical. Their grouping was carried out under the criteria issued by Hernández [6].

- *Analytical-synthetic*, allowed us to carry out a study on the theoretical and methodological foundations on which the assessment of the relevance of intercultural medical care is based. In addition, it facilitated the processing of the information offered by the different instruments applied to diagnose the current state of the problem and the drawing of conclusions.
- *Inductive-deductive*, made it possible to make inferences and generalizations about the assessment of the relevance of intercultural medical care, through the use of the neutrosophic linguistic scale, from which new logical conclusions are deduced.
- Systemic**:** It was used in understanding the interactions that occur between each of the questions designed in the survey, this was verified with the Pearson correlation test.
- *Survey***:** It was applied to obtain information that would allow characterizing the assessment of the relevance of intercultural medical care, for its tabulation a neutrosophic linguistic Likert scale is used.

Questions contained in the survey:

- Question 1. Do you assess the importance of medical treatments based on interculturality?
- Question 2. How do you assess the benefits of using medicine based on interculturality?
- Question 3. What is your assessment regarding the inclusion of intercultural medicine techniques in Ecuador in current medical care?

2.4 Neutrosophic method used

For the development of the research the following steps are used [7]:

- Step 1 Identify the problem
- Step 2 Choice of method and type of scale
- Step 3 Collect the information
- Step 4 Data interpretation
- Step 5 Study validation

Neutrosophic evaluative scale:

A neutrosophic Likert scale was used to determine the relevance, where the values under consideration are composed of PA (x), IA (x), NA (x), where PA (x) denotes a positive membership, IA (x) is indeterminate, and NA (x) is negative. The health sciences professional can evaluate whether their satisfaction criteria belong to the five sets. This scale used single value neutrosophic numbers (SVNN) [8,9,10]. An SVNS is an object with the following form [11,12,13].

Definition 1: Let X be a universe of discourse. A *Single-Valued Neutrosophic Set* (SVNS) A on X is a set of the form:

$$A = \{\langle x, u_A(x), r_A(x), v_A(x)\rangle : x \in X\} \quad (3)$$

Where $u_A, r_A, v_A : X \rightarrow [0,1]$, satisfy the condition $0 \leq u_A(x) + r_A(x) + v_A(x) \leq 3$ for all $x \in X$. $u_A(x), r_A(x)$ and $v_A(x)$ denote the membership functions of truthfulness, indeterminate, and falseness of x in A, respectively. For convenience a *Single-Valued Neutrosophic Number* (SVNN) will be expressed as $A = (a, b, c)$, where $a, b, c \in [0,1]$ and satisfy $0 \leq a + b + c \leq 3$.

The interval represents the true, indeterminate, and false memberships of x in A, respectively. For convenience, an SVN number will be expressed as A, where a, b, c [0, 1], y + b + c ≤ 3

Linguistic term	SVN numbers
Very Relevant (VR)	(1,0,0)
Relevant (R)	(0.70,0.25,0.30)
Medium Relevant (MR)	(0.50,0.50,0.50)
Something Relevant (SP)	(0.30,0.75,0.70)
Not Relevant (NR)	(0,1,1)

Table 2. Linguistic terms of the scale[14, 15].

Let A = (T, I, F) be a single-valued neutrosophic number, a scoring function S related to a single-valued neutrosophic value, based on the degree of belonging to the truth, the degree of belonging to indeterminacy and the degree of belonging to falsehood is defined by [16,17]:

$$\boldsymbol{s(V_i) = 2 + T_i - F_i - I_j} \quad (3)$$

The scoring function for single-valued neutrosophic sets is proposed to make the distinction between the numbers [18].

2.5 Statistical analysis used

Statistical analyzes were performed with SPSS v. 20 (SPSS Inc., Chicago, IL, United States). The data relating to descriptive statistics will be presented below through the distribution of frequencies, while the Pearson correlation test was used to identify whether or not there were coincidences in the responses of health science professionals to the survey questions.

3 Results

Answer to question 1

When looking at graph 1, you can see the results of question 1 of health professionals regarding the importance of medical treatments based on interculturality. Where it can be seen that only 3 of them for 10.1% of the total sample considered that these are very relevant, for their part 2 for 6.7% consider that they are relevant and 7 for 23.3% evaluate it of averagely pertinent.

It is noteworthy that the majority of respondents 11 to 36.6% consider that they are something relevant and that they can still be used but always as an alternative treatment. The remaining 7 for 23.3% considered it not relevant and stated that with advances in science and technology they do not believe that they are already useful to current medicine.

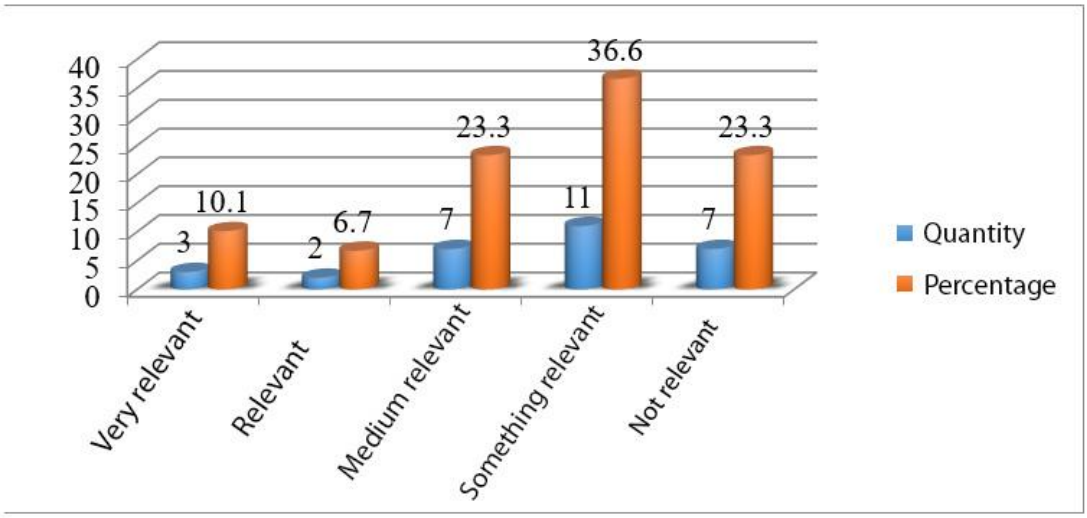

Figure 1. Results obtained in question 1. **Source**: Microsoft Excel for Windows processing results.

Answer to question 2

Figure 2 shows the results of question 2 of the survey, where 4 professionals for 13.3% consider that the benefits of the use of medicine based on interculturality are still very relevant today. On the other hand, 3 for 10% of the sample considers that they are pertinent.

On one hand, the majority of the investigated subjects 11 for 36.7% consider that they are moderately pertinent and that accompanied by other scientifically proven techniques they give positive results. The Something relevant category was indicated by 9 professionals for 30% and the rest of the investigated 3 for 10% considered that they are not relevant.

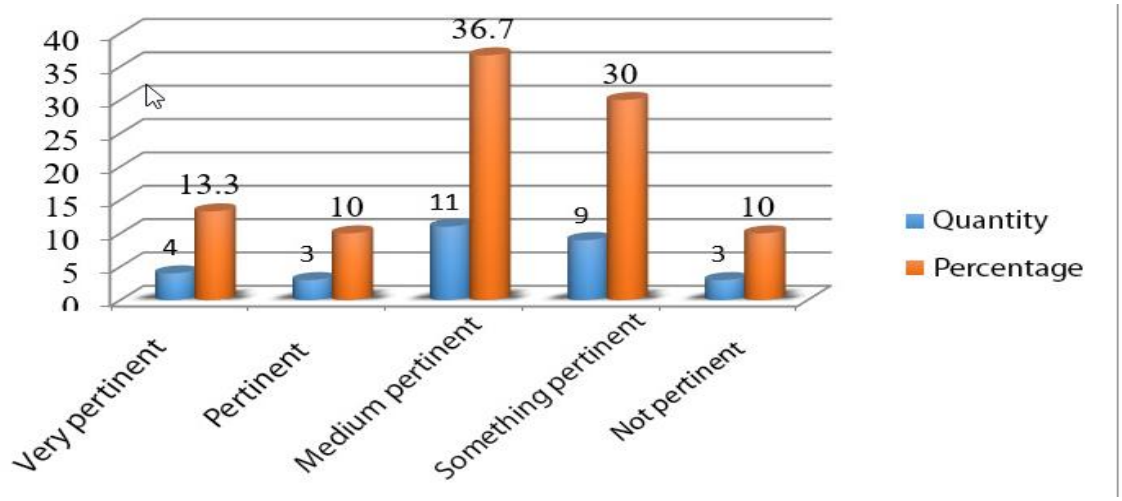

Figure 2. Results obtained in question 2. **Source**: Microsoft Excel for Windows processing results.

Answer question 3

The results of this question are illustrated in graph number 3. Where 5 of the professionals surveyed for 16.6% consider that the inclusion in current medical care techniques of intercultural medicine in Ecuador is very pertinent, always in conjunction with the traditional one. While 4 for 13.4% value its inclusion as pertinent.

Most of the professionals in the study (12 for 40%) valued that their inclusion is moderately relevant, they also reflected in the qualitative assessment of the survey that it is possible as an alternative. The category of something pertinent obtained 6 professionals for 20%, while the remaining 3 study subjects for 10% considered that it is not pertinent.

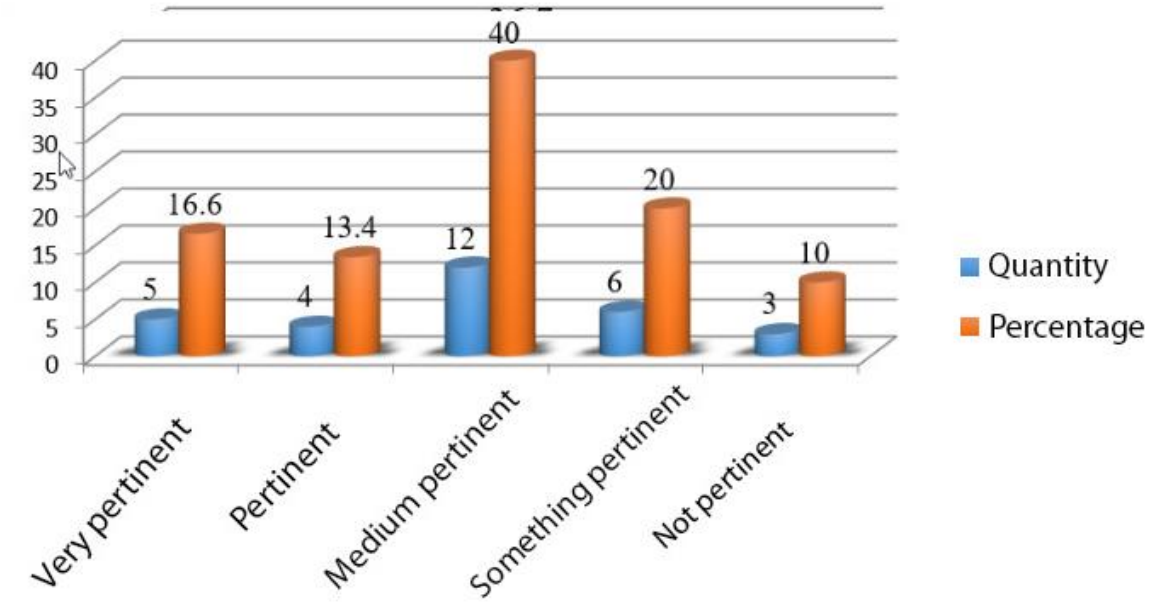

Figure 3. Results obtained in question 3. **Source**: Microsoft Excel for Windows processing results.

Study validation

To deepen the validity of the results, a correlation study was carried out, since this type of statistical analysis allows the assessment of the relationships between 2 or more variables, that is, the degree of possibility that they coincide. Table 3 shows the correlation matrix between the variables corresponding to the three questions of the survey that were applied to health professionals. Correlation coefficients have been calculated in all possible pairs of study variables.

The interpretation of the results of the Pearson test carried out by SPSS 20.0 for Windows, makes it evident that they are significant, since r, ($p < 0.005$). In this sense, it can be seen that the responses to the content of the survey questions correlate with each other. All of the above makes evident the level of assessment of the relevance of intercultural medical care. A question that accepts the hypothesis raised.

Correlations

		Importance	Profits	Inclusion
Importance	Pearson's correlation	1	.912 **	.918 **
	Sig. (Bilateral)	-	, 000	, 000
	N	30	30	30
Profits	Pearson's correlation	.912 **	1	.941 **
	Sig. (Bilateral)	, 000	-	, 000
	N	30	30	30
Inclusion	Pearson's correlation	.918 **	.941 **	1
	Sig. (Bilateral)	, 000	, 000	-
	N	30	30	30

Table 3. Correlation matrix between the responses of health science professionals. **Source**: SPSS 20.0 processing for Windows
**. The correlation is significant at the 0.01 level (bilateral).

Conclusion

The analysis of the theoretical and methodological references on Assessment of the relevance of intercultural medical care shows the existence of different bibliographic sources on the subject, however, tools are required to promote a current assessment of this problem.

The methodological logic followed was based on the general methods of science for the statistical analysis of the assessment of the relevance of intercultural medical care.

The interpretation of the results offers validity to the research carried out since employing statistical analysis, particularly the Pearson correlation test, allowed the validation of the instruments used in the research with a significance level of p 000.

It is important to study in-depth in future works the construction of the computer tool and the use of the Neutrosophic Compensatory Logic are considered since the latter provides linguistic models that express through logical propositions the translation of ambiguous phrases into the colloquial style as they refer.

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