Evaluation of nursing management reasoning using the concordance test script

https://doi.org/10.56238/globalhealthprespesc-026

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ABSTRACT
Objective: to develop, apply and analyze an instrument for the evaluation of managerial reasoning in nursing in situations of uncertainty based on the concordance test script.
Method: cross-sectional study, carried out in the cities of Botucatu and Lins, state of São Paulo, Brazil. The instrument, based on the theory of agreement of scripts in the form of situations in the dimension of nursing management, was elaborated by three specialists (panel of questions), validated by fourteen specialists in nursing management (reference panel) and applied to fifty students of the last semester of the undergraduate nursing course. Data collection was done electronically, both for the reference panel and for the students The analysis was quantitative through descriptive statistics, analytical and reliability test through Cronbach's alpha. Results: construction of the instrument with one hundred situations of the nursing management process. Validation of all situations by the reference panel that guided the comparison of students' answers. The mean score of the reference panel was 77.06, higher than the mean score of the group of students, which was 67.67, with p=0.0004, demonstrating statistical significance. Data reliability was analyzed using Cronbach's alpha, which was 0.95. Conclusion: the concordance test script proved to have good applicability to evaluate managerial reasoning in nursing in the context of uncertainties, significantly evidencing that the reference panel presents less variability in its answers than the students.

Keywords: Education, Decision-making, Management of professional practice, Nursing evaluation, Nursing.

1 INTRODUCTION

The Law of Guidelines and Bases that governs nursing education designates that professionals must be critical, reflective, dynamic, active and able to understand the new demands and the real needs of the country. In these guidelines, the need to develop competencies (knowledge, skills and attitudes) in: health care, decision-making, communication, leadership, administration and management and permanent education is highlighted.[1] Among these competencies, those that refer to the nursing management process stand out.

A study2 showed that undergraduate nursing courses prepare students for the development of actions of promotion, prevention, management and nursing techniques, in line with the generalist training proposed in these guidelines.

The managerial competencies, from the perspective of nurses, contemplate leadership, communication, permanent education in health and the need for professional experience for the

performance of functions that include the prediction of materials, dimensioning and scales of nursing staff, organization of the work environment; emphasis on teamwork, in order to achieve the quality of care provided.[3]

For the development of managerial competencies, the formative process is complex, as it comprises elements that are subjective and present in the political microspace of interactions between teachers and students in the classroom and between social actors in the field of practice, as well as interaction in the socio-economic, cultural and political context of the society where they are inserted.[4]

A study that mapped the competencies (knowledge, skills and attitudes) in relevant managerial themes during the nursing graduation concluded that in the field of knowledge, the largest number of specific managerial competencies listed and the smallest gaps were verified. Skills and attitudes had the largest *gaps*, suggesting that they are less apprehended in the disciplines of Nursing Administration by the students, thus inferring that there is a need for transformations in the management education of nurses.[5]

Decision-making as a managerial competence of nurses is presented in the ability to evaluate and decide the most appropriate conducts based on evidence, which is in line with the clinical reasoning process. Understanding it is part of the dynamics for teaching managerial competencies in practical situations, which are permeated by situations of uncertainty.[6]

The evaluative methods currently proposed, such as written tests and multiple choices, have great capacity for scientific technical measurement, however, when directed to the evaluation of decision-making skills, they are faced with totally ineffective methods, subjugating the student's ability to discuss practical solutions that have a high degree of uncertainty.[6]

In this sense, the ability to make decisions under uncertainty and solve ill-defined problems are paramount elements of professional competence.[7]

In this perspective, the instruments available for the evaluation of clinical nursing reasoning have great limitations, since they are tests with very well defined questions and solutions. The available tools escape from the reality found in professional practice, because real situations are often faced with poorly defined situations permeated with uncertainties.[8]

Studies based on the script agreement framework, *using* script theory, have brought a new dynamic to evaluate decision-making in these situations through the *Script Concordance Test* (SCT).[7, 14]

The SCT is a written test, widely used in medical schools and related fields. The tests present clinical scenarios of professional life, with circumstances permeated with incomplete information, complex and with a high degree of uncertainty.[9]

However, the use of TSS in nursing is still incipient, with all studies conducted outside Brazil. One of the studies8 considers that it is necessary to ensure that new nurses are prepared to perform

clinical evaluation competently, and nurse educators are challenged to develop effective teaching methods for the development of skills and reasoning in clinical evaluation in nursing students.

In the SCT examiners are presented with a brief description of an authentic case, followed by a series of questions for judgments regarding diagnostic options and conducts, when new elements of information are provided.[14]

Through a survey in the literature, the use of TSS in clinical reasoning was identified, however, with regard to the management process there are gaps, because there are no studies on the reasoning for the decision-making process of nurses using this test. These gaps, combined with the experience of researchers in the teaching of undergraduate nursing courses in the area of nursing management, aroused the interest in answering the following question: Can the TSS contribute to the instrumentalization of reasoning in the dimension of management in undergraduate nursing?

It is believed that the use of a validated instrument can contribute to the instrumentalization of the evaluation of this competence and guide the teaching of nursing education. Thus, the objectives of this study were: to develop, apply and analyze an instrument for the evaluation of managerial reasoning in situations of uncertainty based on the *Script Concordance Test* (SCT).

2 METHOD

This is a cross-sectional quantitative study conducted in the state of São Paulo, Brazil.

The first stage consisted of the construction of an instrument based on the theory of script agreement, in the form of real cases in the dimension of nursing management. These cases were elaborated by a group of nursing management specialists who constituted the panel of questions.

Studies recommend that the components of the panel for the elaboration of the questions are not numerous, and may consist of two to three people[9-11]. Thus, three professors who are experts in the area of management from different public universities in the State of São Paulo were asked to collaborate in the construction, analysis and suggestions of the tests.

The scenarios and situations constructed were guided by the nurse's managerial competencies and did not contain all the necessary data for their resolution, corroborating with the situations experienced in professional practice.

The dimensions of management addressed are independent of each other, and were built with the intention of raising doubts and enabling a reflection to answer them.

After the construction of the instrument, the pilot application stage was carried out. This application was performed before sending the instrument to the specialists in the area of nursing management who constituted the reference panel. To this end, the instrument was sent to five professors, specialists, with experience and degree in nursing management. The participants in this stage did not participate in the question panel and the reference panel. This phase aimed to improve

the instruction for solving the tests, detect failures and enable adjustments that were necessary. In this stage, content validation was performed.

After the pilot application, the instrument was finalized and the specialists of the reference panel were selected, from the curricula inserted in the Lattes Platform considering the following inclusion criteria: being a nurse, with specialization and or strictu senso post-graduation in the area of nursing management, with experience and professional performance for ten years or more. A total of 30 specialists from several higher education institutions with undergraduate nursing courses in the country were invited, 14 agreed to participate in the study, answered the tests and the answers were analyzed in order to establish the reference for the case scores.

After the construction of the scores by the reference panel, the instrument was applied to the undergraduate students of the last semester of the nursing graduation. For the undergraduate nursing students, 58 invitations were sent to the students considering the inclusion criteria: to be attending the last semester of the graduation and to have successfully completed the nursing management discipline. Of the students invited, 50 agreed to participate in this study by answering the questionnaire.

The instrument was adapted to the electronic format, using *Google Drive*, and both the specialists, who constituted the reference panel, and the students answered the questions through this format.

Subsequently, the resulting data were grouped and compared with the data obtained through the responses of the reference panel, attributed by the Likert scale.

Data analysis was performed using descriptive data statistics, with frequencies and percentages for the categorized variables and means, medians and standard deviation for the continuous quantitative variables. To verify the consistency of the questionnaire, Cronbach's alpha was performed. Cronbach's alpha is used to estimate the reliability and internal consistency of a scale, that is, to assess the dimension in which the items of the instrument are correlated.[15th]

Data normality was verified using the Shapiro-Wilk test. As normality was evidenced, we chose to use a generalized linear model followed by Tukey to verify the difference between the score that represents the responses of students and specialists. All statistical analyses were conducted using SAS *software* version 9.2 for *Windows* with a significance level of 5%.

The study complied with national and international standards of ethics in research involving human beings, receiving a favorable opinion from the Research Ethics Committee, ensuring the anonymity of the participants and the clarification of the research.

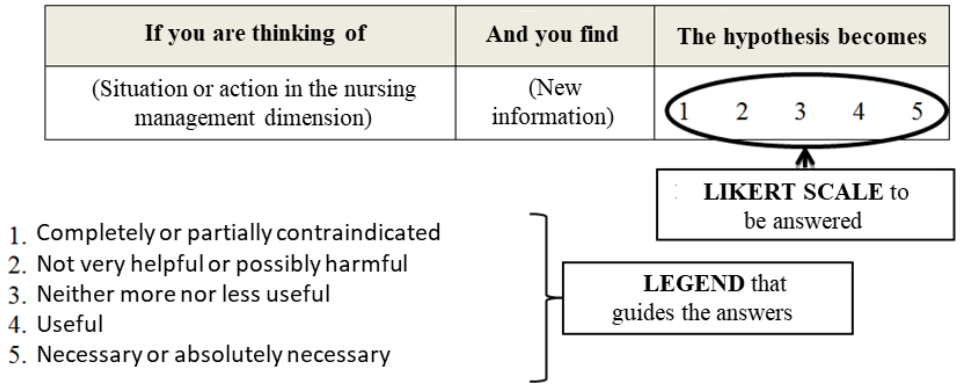
3 FINDINGS

The construction of the scenarios and situations of the decision-making process contemplated three parts, following the guidelines proposed by the *guidelines13*, shown in Figure 1. The first column

presents an action, or conduct within the scope of management. The second column, a new piece of information to guide the decision-making process. The last column is formed by a five-point Likert scale, which represents the possibilities of decision making in the face of each new piece of information.

The following is the structural model of the situations as well as the scoring scale:

Figure 1: Structural model of the situations and their scores.



20 scenarios and 100 situations were elaborated. All of them were described thinking about the decision-making processes through the managerial competencies of nursing, as shown in scenario 14 with situations 52, 53, 54, 55 and 56, presented as an example in chart 1.

Table 1 - Description of scenario 14. Botucatu, SP, Brazil.

Scenario 14: Nurse of the emergency sector forwards to the nursing management a request for a review of the personnel dimensioning, alleging expansion of the functional sites without adequacy of the professional quantity.		
If you're thinking of	And you find	The hypothesis becomes
52- Use pre-sizing to ascertain the need	Expansion of the emergency department due to the establishment of a reference in trauma	1 2 3 4 5
53- Expand humanized care strategies	Hiring a nurse for triage with risk classification	1 2 3 4 5
54- Prevent adverse events	Absence of mid-level professionals due to maternity and sick leave without replacement	1 2 3 4 5
55- Establish provisional measures to supply the necessary quantity	Possibility of establishing the modality of paid shifts	1 2 3 4 5
56- Evaluate current quantitative for new sizing and provision of human resources	Institution committed to the reform of the unit, with no financial resources for new hires at the moment.	1 2 3 4 5

Caption:
1. Contraindicated completely or partially
2. Not very helpful or possibly harmful
3. No more and no less useful
4. Useful
5. Necessary or absolutely necessary

To evaluate the scores, the aggregate score method was used. In this methodology, any answer

given by an expert has a value of its own, even if there is no agreement with the other experts. The score of each item is made according to the frequencies given for each point of the Likert scale.

This scale maintains agreement with the *script theory* and demonstrates the variability of answers offered by experts in the decision-making process through situations of uncertainty.

To form the aggregate score, the frequencies in which the experts' answers were marked in each of the situations were verified (Table 1). Then, for each of the situations, the score value was obtained. This value was used to score the instrument.

Table 1. Example of the frequency in which the answers were marked by the specialists for the formation of the score, Botucatu, SP, Brazil.

Frequency of responses	S01	S02	S03	S04	S05
Answer 1	0	0	0	1	0
Answer 2	2	0	1	1	2
Answer 3	0	1	2	1	2
Answer 4	3	8	3	5	4
Answer 5	9	5	8	6	6

S01= situation 1; S02= situation 2; S03= situation 3; S04= situation 4; S05= situation 5.

According to the example shown in table 1, considering situation 2 (S02), answer option 4 presented the highest frequency of choices by nursing management specialists. This frequency of responses (eight) was then considered the reference value or modal value for this situation. Thus, the score for each response of S02 was obtained by dividing the number of times this response was marked by the reference value. In this sense, the score of answer option 1, for situation 2, is 0/8; for answer choice 2, 0/8; for answer choice 3, 1/8; for answer choice 4, 8/8; and for answer choice 5, 5/8. Thus, the score values for the responses of situation 02 were formed, as can be seen in table 2.

Table 2. Example of scores calculated using frequency and reference value, Botucatu, SP, Brazil.

Calculation of Scores	S01	S02	S03	S04	S05
Answer 1	0,00	0,00	0,00	0,17	0,00
Answer 2	0,22	0,00	0,13	0,17	0,33
Answer 3	0,00	0,13	0,25	0,17	0,33
Answer 4	0,33	1,00	0,38	0,83	0,67
Answer 5	1,00	0,63	1,00	1,00	1,00

S01= situation 1; S02= situation 2; S03= situation 3; S04= situation 4; S05= situation 5.

The calculation was also performed to demonstrate the performance in relation to the maximum possible score (100 situations = 100%) for each of the research groups. The group of students presented a 65% performance, while the group of specialists presented a 77% performance.

Through descriptive and analytical statistical analysis, the means, medians, standard deviations (SD), minimum (Min.) and maximum (Max.) values and the variation of the scores of the groups

(specialists and students) that answered the test were obtained.

All specialists (N=14) and students (N=50) answered all items (N=100). The group of specialists presented a mean of 77.06, with a median of 76.68 and standard deviation of 6.70. The minimum score for this group was 67.29 and the maximum score was 87.21. In the group of students, the mean was 65.97, with a median of 67.67 and a standard deviation of 10.46. In this group, the minimum score was 36.50 with a maximum of 83.71. The variation of the scores was higher in the group of students (47.21) than in the group of specialists (20.23).

The hypothesis of normality of the distributions was tested and confirmed by the Shapiro-Wilk test (SW) with scores in the specialist (p=0.5655) and student (p=0.2395) groups.

Following the hypothesis of normality of the samples, the Tukey test was used to compare the mean total scores of the groups of specialists and students. The mean score of the group of specialists (77.06) was higher than the mean of the scores of the group of students (67.67), with *p=0.0004.*

The Cronbach's alpha coefficient, considering all participants in this study, for the total number of items (N=100), was 0.95.

4 DISCUSSION

During the elaboration of the scenarios and situations, the objectivity, clarity and precision of the same were emphasized, ensuring the clear description of the object of study, but with incomplete contents and with a high degree of uncertainty.[7-12,13] These scenarios and situations were described through the practical and daily experience of the professional nurse in the performance of the management process.

The scenarios are short, with challenging situations due to their context of uncertainty. Even experts have found it difficult to provide a single answer to the problem because the data are incomplete, or because multiple options would be possible, or because there is no consensus in the literature on the strategy to follow.[13]

The literature emphasizes that SCTs are case-based tests, consisting of short scenarios where each learner needs to interpret whether new information contributes to the decision-making process.[16]

The structure of the situations was assigned through the theoretical framework *of the Concordance Test Script*, using three columns, where the first presented a nursing management situation, in the second column a new information and in the third, a numerical sequence of the Likert type, as highlighted in the literature.[7-14,16-17].

For scoring, a Likert scale was used to contextualize the uncertainty, where it was possible to score from 1 to 5, where 1 referred to complete or partial contraindication, 3 as neither more nor less useful and 5 to full agreement with the hypothesis.

The use of the scale through the aggregate method has demonstrated a substantial variability of

specialists, according to the practical context of professional life. This sense, a comparative study between the use of the traditional method and the aggregate method, the latter proved to be of great importance to contextualize the practice of reasoning in situations of uncertainty.[11,16]

The formation of a reference panel is a feature of the *Concordance Test Script*. In this research the reference panel corroborates quantitatively with other studies that indicate the need for the reference panel with 10 to 20 members, which guarantees the reliability of the scores.[13-14.17]

The reference panel of this study was characterized as multicenter, comprising specialists from eight different institutions, with sufficient experience time to ensure reliable scores for replication. The recommendation guide discusses the importance of ensuring professionals with experience and aptitude in the area of study to enable an effective reference panel, which corroborates the methodology of this study.[13]

It was significantly evidenced ($p=0.0004$) that the reference panel presented less variability in its answers than the students. It is inferred that this result is associated with a better ability of specialists to make decisions, because deciding, solving problems and thinking critically are learned skills that improve with practice and consistency.[18th]

The instrument presented good data reliability using Cronbach's alpha of 0.95. The validity of an instrument depends on some variables such as the object of study, the objectives of the instrument and the population to be examined. In this study, validation was performed by expert evaluation, through content validation.[19]

The application of the instrument in online format facilitated the process of application of the instrument, but the fact that the electronic form used does not allow the partial saving of the data associated with the extension of the instrument elaborated, may have been difficult to acquire new specialists since these, in most situations, are involved in numerous research and simultaneous activities.

Even with these difficulties, the electronic format proved to be efficient for the process of data collection and analysis, enabling a dynamic monitoring and treatment of all research.

The managerial dimensions proposed in the performance of the TSS are corroborated in the literature, since they comprise the theme that permeates the management process in nursing that is exclusively performed by the nurse.[20th]

The nurse's managerial work process often goes through situations that require decision-making through a thorough evaluation of the professional's previous knowledge, who in turn needs to do it responsibly, because his decision will directly affect health actions.[21]

The central theme of nursing management evaluation in the context of uncertainties emerges from decision making, since everything a nurse does requires decision making.[22]

The results of this study are innovative in the Brazilian context, since the use of TSS in the

nursing management process was not found in the literature. It is understood from this research that other studies can be carried out, expanding the possibility of teaching strategies for the managerial decision-making process that is permeated by situations of uncertainty.

The limitations refer to the use in a single context of nursing students, as well as the small number of participating students. Also due to the impossibility of comparing in the literature the results of this study in the scope of the TSS applied in the area of nursing management.

5 CONCLUSION

We developed 20 scenarios and 100 situations for the evaluation of managerial reasoning in situations of uncertainty based on the TSS analyzed and validated by a panel of experts (panel of questions, participants of the pilot study and reference panel).

The study provided evidence that TSS provides a reliable and objective means of evaluating reasoning. In the context of nursing education, it demonstrates a viable strategy to evaluate reasoning in students.

The application of the TSS in two different moments of training demonstrated the lowest variability of the data and the highest score among the specialists, allowing them to be detected by the scores, thus affirming the need for a standard *of experts* in the reference panel, which will certainly enable the future use of this instrument in teaching.

Although the TSS is widely discussed in related areas and with extensive international publication, the study is a pioneer in the teaching of Brazilian nursing.

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