



## Semantic analysis of a item bank on programmatic situations of health vulnerability

### *Análise semântica de um banco de itens sobre situação programática de vulnerabilidade em saúde*

### *Análisis semántico de una base de elementos sobre situación programática de vulnerabilidad en salud*

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#### RESUMO

**Objective:** to semantically analyze a bank of items related to the programmatic situation of health vulnerability. **Method:** semantic analysis, the final stage of the theoretical psychometric study that aims to evaluate the understanding of the items by the target audience. Online data collection was carried out in 2021, with 30 subjects selected from convenience sampling. Clarity, adequacy, and understanding criteria were used on a Likert scale. Sociodemographic, health, and work variables were processed according to absolute frequencies and proportions when nominal and by the median of numbers in data analysis software. **Results:** There was a predominance of women (63.3%), between 21 and 37 years old (76.7%), with a higher education degree (43.3%), and users registered with the Family Health Strategy (53.3%). All items have parameters  $\geq 0.85$  and, therefore, were considered clear, adequate, and comprehensive. The overall average for each classification was clear 0.93, adequacy 0.91, and understanding 0.93. **Conclusion:** the items analyzed semantically were considered clear, adequate, and understandable.

**Descriptors:** Health Vulnerability; Validation Study; Semantic Differential.

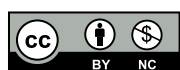
#### ABSTRACT

**Objetivo:** Analisar semanticamente banco de itens relacionado à situação programática da vulnerabilidade em saúde. **Método:** Análise semântica, etapa final do polo teórico de estudo psicométrico cujo propósito é avaliar a compreensão dos itens pelo público-alvo. Realizou-se coleta de dados on-line, em 2021, com 30 sujeitos selecionados a partir da amostragem por conveniência. Utilizaram-se os critérios clareza, adequação e compreensão em escala Likert. Variáveis sociodemográficas, de saúde e trabalho, foram processadas segundo suas frequências absolutas e proporções quando nominais e pela mediana de numéricas em software de análise de dados. **Resultados:** Prevaleram mulheres (63,3%), entre 21-37 anos (76,7%), com grau de escolaridade superior completo (43,3%) e usuárias cadastradas na Estratégia Saúde da Família (53,3%). Todos os itens possuem parâmetros  $\geq 0,85$  e, portanto, foram considerados claros, adequados e compreensíveis. A média geral para cada critério foi: clareza 0,93, adequação 0,91 e compreensão 0,93. **Conclusão:** Os itens analisados semanticamente foram considerados claros, adequados e compreensíveis.

**Descritores:** Vulnerabilidade em saúde; Estudo de validação; Diferencial Semântico.

#### RESUMEN

**Objetivo:** Analisar semánticamente base de elementos relacionado con la situación programática de la vulnerabilidad en salud. **Método:** Análisis semántico, etapa final del polo teórico de estudio psicométrico cuyo propósito es evaluar la comprensión de



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los elementos por el público objetivo. Fue realizada recogida de datos en línea, en 2021, con 30 sujetos seleccionados a partir de la muestra por conveniencia. Fueron utilizados los criterios claridad, adecuación y comprensión en escala Likert. Variables sociodemográficas, de salud y trabajo, fueron procesadas según sus frecuencias absolutas y proporciones cuando nominales y por la mediana de numéricas en software de análisis de datos. **Resultados:** Prevalcieron mujeres (63,3%), entre 21-37 años (76,7%), con grado de enseñanza superior completo (43,3%) y usuarias registradas en la Estrategia Salud de la Familia (53,3%). Todos los elementos poseen parámetros  $\geq 0,85$  y, por lo tanto, fueron considerados claros, adecuados y comprensivos. La media general para cada criterio fue: claridad 0,93, adecuación 0,91 y comprensión 0,93. **Conclusión:** Los elementos analizados semánticamente fueron considerados claros, adecuados y comprensivos.

**Descriptor:** Vulnerabilidad en salud; Estudio de validación; Diferencial Semántico.

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## INTRODUÇÃO

Health promotion is the process that allows people to increase control and improve their health, representing, then, social commitment and political process that goes beyond actions aimed at the skills and capacity of individuals, but which are also aimed at changing the determinants of social, environmental and economic health<sup>(1)</sup>. Vulnerability in health is expressed by the condition of human life based on rearrangements in power relations, which form the social subject in which precariousness is produced when health promotion movements are not enhanced<sup>(2)</sup>. These two dimensions are connected, since through health promotion practices we seek to reduce vulnerabilities.

Health vulnerability has several concepts and sub-concepts, such as the programmatic situation, for example, which presents institutional characteristics and processes related to health care for the population. This programmatic situation has two elements that characterize it: (1) infrastructure, considered as a set of elements that allows the production of goods and services, and (2) work process understood as a product of articulation between social actors in health services<sup>(2)</sup>. Thus, although the programmatic situation refers to health services, the vulnerability always lies with the subject. In this way, it is possible to work on health promotion when seeking to identify situations that make people vulnerable, for example, when the infrastructure or work process is precarious or insufficient. In other words, despite being a relevant component in vulnerability, little has been investigated, either because of the variability in the concept<sup>(3)</sup> or because there are no specific health instruments<sup>(2,4,5)</sup>.

In research, especially in Brazil, the programmatic situation of vulnerability has been analyzed in different contexts, such as violence<sup>(6)</sup>, consumption of alcohol and other drugs<sup>(7)</sup>, food insecurity<sup>(8)</sup>, and sickle cell disease<sup>(9)</sup>, among others. However, such research was not based on health instruments developed, evaluated, or tested in health organizations' infrastructure or work processes. Everyone has their approach, and therefore, it is a challenge to analyze this part of the vulnerability.

In this sense, researchers from a Brazilian university developed an item bank that underwent its first analysis, subsequently presenting results with high-quality evidence of validity regarding its content<sup>(10)</sup>. However, checking just the content is not enough, as the analysis is carried out by experts in the field, and the items need to be presented to the public. Appropriately, in this article, we present a semantic analysis of the item bank programmatic situation of vulnerability in health mentioned above.

The research question that guided the study was: is the item bank of the programmatic situation of vulnerability presented to a sample of subjects clear, adequate, and comprehensive? The objective, therefore, was to semantically analyze an bank of items of the programmatic situation of health vulnerability.

## METHOD

This is a semantic analysis of an item bank, which represents the final stage of the theoretical pole of psychometric studies<sup>(11)</sup> before being applied to the estimated target population for the construction and validation of the health instrument. In this case, we sought to analyze the clarity of the language, adequacy, and understanding of the items to evaluate the construct programmatic situation.

Participants were people over 18 years of age, residents of Fortaleza, and who used the Family Health Strategy (ESF). The choice to use UBS is justified because there is a higher chance of people needing access to healthcare in this location than in other healthcare services, for example, hospitals, so the assessment of items was more reliable

and via virtual snowball sampling<sup>(12)</sup>. The free and informed consent forms were previously sent to all subjects in the sample, and after confirmation of acceptance via WhatsApp® or email, a time for an interview was scheduled. The sample consisted of 30 people. From the presentation of items to lower extracts of the target population, different extracts were used, thinking of a clearer and more direct format. In contrast, for the population with a higher level of education, apparent validity is observed<sup>(11)</sup>.

In this way, some steps<sup>(11)</sup> were followed: (1) interview the subjects and (2) present the items one by one in a brainstorming atmosphere. Thus, items that did not present problems in understanding were not reformulated, whereas items that presented difficulties in understanding were reformulated to be included in an item bank that investigates the programmatic situation of vulnerability in health.

The interviews were carried out in September 2021 via the Google Meet platform, and a data collection instrument was completed. The researcher himself wrote down the participant's responses. We chose this tool as it was the most widespread during the COVID-19 pandemic for holding classes, events, or conferences. Each interview lasted around 25 minutes, and firstly, sociodemographic aspects of each participant were questioned, such as name, age, income, previous illnesses, COVID infection, need for post-COVID follow-up, health service they use most, disabilities, and work in the Health area.

Next, the 76 items that make up the item bank of the VS programmatic situation were presented, 22 for infrastructure and 54 for the work process. Research participants were instructed on how they would participate in evaluating the items, which were: each item was evaluated according to its clarity of language (I know all the words), adequacy (these are situations that can happen), and understanding (I can explain the item for the interviewer)<sup>(13)</sup>. For the data collection process at this stage, the researcher read the item to the participant and requested three grades according to their evaluation criteria. A Likert scale from one to five was used for the participant to evaluate the item, being 1) I understand the question very little, 2) I barely understand the question, 3) I understand the question considerably, 4) I really understand the question, and 5) I very much understand the question. Finally, for participants who made comments on certain items, suggestions were noted.

The data was organized in a Microsoft Excel spreadsheet®. Then, the content validity coefficient (CVC) was calculated, considered 0.80, the cut-off score as a parameter to select clear, appropriate, and understandable items. Items were classified as acceptable when  $\geq 0.80$  and unacceptable if the parameter was not reached. The CVC calculation was the average of each participant's item responses for each criterion divided by five (response scale) minus one divided by 30 (number of subjects) exponentiated to 30 (number of subjects), characterized by the formula in Microsoft Excel®:  $= (\text{AVERAGE}(\text{subject}_1:\text{subject}_X)/5 - (1/\$number\_of\_subjects)^{number\_of\_subjects})$ .

A descriptive analysis of the variables was carried out. For categorical ones, absolute numbers and proportions (sociodemographic/health) were presented. For continuous items (items), the CVC was presented according to clarity, adequacy, and understanding through the average of all participants.

This study was approved by the Human Research Ethics Committee of the State University of Ceará under an opinion of 4,393,432 and followed the recommendations of resolution 466 of the National Health Council of 2012.

## RESULTS

30 people were interviewed (table 1). The profile was: women (63.3%; n=19), aged between 21-37 (76.7%, n=23), self-declared white (50.0%, n=15), and with a completed higher education degree (43.3%, n=13). Among those living with some illnesses (36.7%, n=11), those mentioned were mental disorders such as anxiety, depression or bipolar disorder, obesity, osteoporosis, diabetes, hypothyroidism, systemic arterial hypertension, and some allergies. The prevalent health service was the ESF (53.3%, n=16). COVID-19 affected five people (16.7%), and two reported being monitored due to the consequences. Overall, participants reported that in the last 12 months, they needed a health service at least five times (80%, n=23).

**Table I** - Profile of study participants (n=30). Fortaleza, Ceará, Brazil, 2021.

<b>Variables</b>	<b>n</b>	<b>%</b>
<b>Gender</b>		
Female	19	63.3
Male	11	36.7
<b>Age Group</b>		
21-37	23	76.7
38-54	3	10.0
55-59	4	13.3
<b>Income (real)</b>		
0 - 1.300	14	46.7
1.301 - 2.600	10	33.3
2.601 - 4.000	6	20.0
<b>Color</b>		
Yellow	1	3.3
White	15	50.0
black	4	13.3
brown	10	33.3
<b>Disease</b>		
Yes	y	36.7
No	19	63.3
<b>Smoke</b>		
No	29	96.7
Yes	1	3.3
<b>Bebe</b>		
No	15	50.0
Yes	15	50.0
<b>COVID-19</b>		
Yes	5	16.7
No	25	83.3
<b>Education</b>		
Elementary School	1	3.3
High school	11	36.7
Graduated	13	43.3
Postgraduate	5	16.7
<b>Health worker</b>		
Yes	7	23.3
No	23	76.7
<b>Service you use most</b>		
Clinic	8	26.7
Hospital	4	13.3
ESF	16	53.3
UPA	2	6.7
<b>Needed the service (last 12 months)</b>		
0 – 5	24	80.0
6 – 11	2	6.7
12 - 15	4	13.3

Source: Research data (2021).

The results of the item evaluation showed parameters above 0.80, and the general average for each criterion analyzed was clarity 0.93, adequacy 0.91, and understanding 0.93. This information provides evidence that, semantically, the item statements express a relationship between meaning and structure. Items 4, 7, 17, and 41, deal respectively with ample space for collective activities, equipment for diagnostic exams, delay in consultation related to disabilities, and modified care routines with frequencies received, although acceptable, 0.85 in adequacy (table 2).

**Table II** - Semantic analysis of items by evaluation criteria. Fortaleza, Ceará, Brazil, 2021.

Item	Criteria			Interpretation
	Clarity	Adequacy	Understanding	
01	0.91	0.90	0.92	Acceptable
02	0.92	0.86	0.93	Acceptable
03	0.94	0.91	0.93	Acceptable
04	0.92	0.85	0.92	Acceptable
05	0.93	0.92	0.93	Acceptable
06	0.94	0.90	0.93	Acceptable
07	0.92	0.85	0.91	Acceptable
08	0.91	0.87	0.91	Acceptable
09	0.95	0.90	0.95	Acceptable
10	0.95	0.91	0.95	Acceptable
11	0.95	0.89	0.92	Acceptable
12	0.95	0.91	0.95	Acceptable
13	0.91	0.86	0.91	Acceptable
14	0.95	0.91	0.94	Acceptable
15	0.91	0.87	0.91	Acceptable
16	0.95	0.92	0.94	Acceptable
17	0.88	0.85	0.89	Acceptable
18	0.93	0.91	0.93	Acceptable
19	0.96	0.95	0.95	Acceptable
20	0.91	0.89	0.90	Acceptable
21	0.91	0.91	0.91	Acceptable
22	0.95	0.93	0.95	Acceptable
23	0.87	0.86	0.87	Acceptable
24	0.95	0.95	0.95	Acceptable
25	0.88	0.87	0.88	Acceptable
26	0.93	0.91	0.94	Acceptable
27	0.93	0.92	0.93	Acceptable
28	0.95	0.93	0.95	Acceptable
29	0.96	0.93	0.95	Acceptable
30	0.89	0.89	0.91	Acceptable
31	0.91	0.93	0.93	Acceptable
32	0.93	0.93	0.95	Acceptable
33	0.95	0.93	0.95	Acceptable
34	0.93	0.93	0.95	Acceptable

35	0.89	0.91	0.91	Acceptable
36	0.95	0.93	0.94	Acceptable
37	0.89	0.91	0.92	Acceptable
38	0.94	0.95	0.95	Acceptable
39	0.96	0.94	0.95	Acceptable
40	0.95	0.94	0.95	Acceptable
41	0.85	0.85	0.87	Acceptable
42	0.92	0.94	0.94	Acceptable
43	0.93	0.96	0.95	Acceptable
44	0.91	0.92	0.93	Acceptable
45	0.89	0.87	0.89	Acceptable
46	0.94	0.95	0.96	Acceptable
47	0.95	0.94	0.95	Acceptable
48	0.97	0.95	0.96	Acceptable
49	0.95	0.93	0.95	Acceptable
50	0.93	0.92	0.93	Acceptable
51	0.91	0.92	0.93	Acceptable
52	0.93	0.92	0.93	Acceptable
53	0.97	0.95	0.96	Acceptable
54	0.96	0.93	0.95	Acceptable
55	0.95	0.94	0.95	Acceptable
56	0.95	0.93	0.95	Acceptable
57	0.92	0.90	0.94	Acceptable
58	0.95	0.93	0.95	Acceptable
59	0.95	0.92	0.95	Acceptable
60	0.93	0.95	0.95	Acceptable
61	0.90	0.89	0.89	Acceptable
62	0.95	0.93	0.95	Acceptable
63	0.91	0.92	0.93	Acceptable
64	0.94	0.89	0.93	Acceptable
65	0.95	0.93	0.95	Acceptable
66	0.94	0.93	0.93	Acceptable
67	0.92	0.88	0.93	Acceptable
68	0.93	0.93	0.95	Acceptable
69	0.94	0.93	0.96	Acceptable
70	0.95	0.91	0.95	Acceptable
71	0.93	0.89	0.93	Acceptable
72	0.95	0.94	0.95	Acceptable
73	0.95	0.93	0.95	Acceptable
74	0.95	0.91	0.95	Acceptable
75	0.92	0.91	0.93	Acceptable
76	0.92	0.91	0.93	Acceptable

Source: Authors 2021.

Participants made considerations about the items (Chart 1). Predominantly, there was a reference to the clarification or qualification of terms. Although they could be known; they pointed to possible misunderstanding by other people, both of the infrastructure and the work process as a whole. Considerations were analyzed and incorporated into items to adjust them. In this way, the theoretical pole of the construction of health research instruments was finalized. In this instrument, programmatic vulnerability has 76 items divided into infrastructure, consisting of 22 questions, and work process, consisting of 54. Each item with 7 response options that ranged from 1-7, with 1 being the lowest degree of VS and option 6 being the highest degree of VS found. Answer option 7 must be selected when a specific item does not apply to the subject evaluated.

**Chart 1.** Participants' considerations about the items. Fortaleza, Ceará, Brazil, 2021.

Item	Considerations (participants)
02	Clarify the terms folders, pamphlets (Qualify the term quick services 08)
05	Clarify exam materials (P15)
07	Qualify the term collect blood (P08)
12	Understood that syringes, needles and condoms were related to hygiene (P10)
14	Qualify the term quick services (P4, P10 e P11)
25	Clarify the term delay in service (P2)
26	Clarify good relationships between professionals (P23)
31	Qualify the term aspects of exams (P08)
41	Qualify the term service routines (P1)
45	Clarify the term health advice (P15)
46	Clarify the term routing role (P4)
52	Clarify that health education is for everyone (P2)
61	Clarify that the term feeling safe is related to physical security (P1) Qualify the safety expressed in the item (P2) Qualify the nearest local term (P10)
63	Qualify the term health-related activity (P10)
64	Qualify the term third parties (P4)
65	Clarify the term APP (app) (P2)
67	Clarify the term multidisciplinary (P15)

Source: Research data.

## DISCUSSION

The theoretical pole of construction and validation of health instruments has as its last step the semantic analysis of the items after they have been constructed, reviewed by more than one author, and analyzed by experts in the field. We sought to present the items to a more restricted group from the population to verify the semantic structure of the items that evaluate the programmatic situation to avoid problems when studies with large samples that use them lack understanding. The results of the item evaluation showed clarity of language, adequacy, and understanding by the participants.

The items expand investigations in the field of vulnerability because they are objective questions constructed based on national and international scientific production. Thus, in the interdisciplinary field, the programmatic situation gained evaluative space when little is known about the effects it produces on people's health. Therefore, it is configured as a tool to overcome difficulties and limitations in health promotion practices when there is a lack of prioritization in the work process, lack of infrastructure and physical space, lack of user participation in activities, difficulties in dialogue and coordination with other sectors and violence in the territories<sup>(14)</sup>. Items evaluate these scenarios.

Education was a relevant factor to be analyzed. Table 1 shows that the years of studies were high as undergraduate and postgraduate courses total 60%. Interviews using internet tools require cognition to know how to use them, and research has shown similar results in their samples<sup>(15-18)</sup>. It was observed that the comments made on the items were from this group and, therefore, there is a possibility that the suggestions were related to the level of health literacy

acquired, as, as people learn about its basics and principles, participants tend to observe issues to make the language suitable for the target audience in the development of health materials<sup>(19)</sup>.

Another relevant data was the search for the ESF and the number of times participants needed health services. It is believed that in addition to the issues inherent to the pandemic, such as the need for rapid tests and its effects on mental health, the monitoring of previous illnesses has contributed to this phenomenon. It reflects that although health services have made efforts to prevent diseases and promote health, people often seek them out for treatment<sup>(20)</sup>. Furthermore, these aspects favored the assessment of the adequacy of the programmatic situation in health services as participants got closer to the reality of health services.

The evaluation of the programmatic situation represents micro-organizational contexts of health services concerning care. It was noticed that during the interviews, the participants when giving their answers, reported specific situations related to the item questions and only then perceived that as vulnerability. It signals that the programmatic situation is configured as something subtle within health services at the same time that it produces substantial effects against health promotion.

After the participants' considerations, the readjustment of the items took place intending to explain some terms/ contexts since the words of the questions were obvious. The process to make them simple began with their construction, based on operational definitions, and their subsequent review by two researchers whose objective was to verify the understanding of each item. Participants' suggestions, therefore, make the interpretation of items more accurate and comprehensive.

In this context, the variation of the programmatic situation concept in the field of vulnerability is a challenge, as each reference has its dimensions with multiple concepts and sub-concepts. One of them, for example<sup>(21)</sup>, considers the programmatic dimension to evaluate actions and services, public policies, or low coverage of health prevention and promotion actions to combat diseases. Therefore, building and validating a bank of items exclusively related to infrastructure and work process does not exhaust the assessment of the programmatic situation but enables advances in the collective health field and, above all, in health promotion to reduce vulnerabilities.

Furthermore, concerning the method adopted, studies have used different techniques to perform semantic analysis of items<sup>(22-24)</sup> focusing on language. There is nothing standardized in the literature that instructs researchers to follow guides for this stage in the construction of health instruments, mainly online, which this pandemic moment required. Therefore, it is relevant to search for theoretical references that discuss ways to conduct these studies better and are dedicated to standardizing techniques for the semantic evaluation of health instruments.

Among the limitations imposed by COVID-19, we highlight the reduced access to people and health services eligible for the study, hence the option to collect data online, the scarcity of studies on the topic to carry out comparisons and more accurate analyses, as well as the high level of education of the sample. However, based on the theoretical framework used for the analysis, it was possible to carry out a broad evaluation of the items using already consolidated criteria and, therefore, review and improve them from an external perspective to contribute to advancement in the field of health vulnerability concerning the effects of health services on the care of people, through an objective assessment based on the item bank of the programmatic situation of vulnerability.

## **CONCLUSION**

The item bank objective was to evaluate the programmatic situation of health vulnerability that went through the last stage of the theoretical pole of the construction and evaluation of health instruments, which is semantic analysis. According to the results, it was observed that the set of items is clear, adequate, and comprehensive. Its final version has 76 items distributed across the two concepts that integrate the programmatic situation: infrastructure and work process. Thus, it can be used in research on vulnerability in health to analyze the degree to which health organizations, whether at primary, secondary, or tertiary levels, produce situations of vulnerability to people and, together with this, provide support for the progression of health services in reducing vulnerabilities.

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## **CONFLICTS OF INTEREST**

The authors declare that there is no conflict of interest.



## CONTRIBUTIONS

The authors contributed equally to the preparation of the study; in the search, analysis and interpretation of data; and writing and reviewing the manuscript. The authors have approved the final version of the manuscript to be published and are responsible for all aspects of it, including ensuring its accuracy and integrity.

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