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# Evaluation of the Quality of Assistance in a Prehospital Mobile Emergency Care Service

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### **Abstract**

**Background:** To evaluate the quality of the assistance of a Mobile Emergency Care Service and to compare the evaluation of professionals according to training and level of education.

Methods and Findings: This is a cross-sectional study, with a Donabedian theoretical reference. The sample was all the professionals of a Mobile Emergency Service and data collection performed by a previously validated quality assessment instrument. Some aspects of the service structure were evaluated negatively, and the process was evaluated in a positive way, in general. When comparing the evaluation of quality according to professional category and education, it was verified that the indicators of structure and process were considered appropriate by the professionals of average level and inadequate by the personnel of superior level.

**Conclusion:** The professionals identified flaws in the service structure, which can impact the assistance provided. The level of education influenced the evaluation of the quality of the service.

#### Keywords

Emergency medical Services; Health Evaluation; Prehospital Care; Evaluation studies; Health services.

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## Introduction

Emergency care in Brazil is often the gateway to the Health System, especially for the low-income population, who use this service to receive medical care [1]. The National Emergency Care Policy (PNAU), through the Mobile Emergency Care Service (SAMU), had the mission of organizing the assistance from the Basic Units among its objectives to ensuring the adequate reference of patients in any level of the Health System [2, 3]. Therefore, it is essential to assess the quality of these services to identify problems and propose solutions [4].

In the assessment of health care, the proposal by Donabedian: structure, process, and outcome have been widely used [5, 6]. The structure includes human, physical, material and financial resources. The process has the activities involving the professionals and the patients, based on determined patterns. The outcome consists of the final product of the assistance provided to analyze health status and satisfaction of standards and expectations [5, 7].

In Brazil, there are few studies on the quality of prehospital care and research of this nature may contribute to the advancement of this type of care [8,9]. Thus, the objective of this study was to evaluate the quality of the assistance of a Mobile Emergency Care Service and to compare the evaluation of the professionals according to training and level of education.

# Method

This is a cross-sectional study with a quantitative approach. The data were collected in the SAMU of the State of Rio Grande do Norte (SAMU 192 RN) from August to December 2012. The population was composed of the professionals of the service, and the sample included all the professionals working in the study period. There were 11 nurses, 24 physicians, 56 nursing technicians and 88 drivers, totaling 179 professionals.

Donabedian's proposal for health quality assessment was used as a theoretical reference, but it was decided to evaluate only the structure and process indicators, in the professionals' point of view [5, 6]. The evaluation of the outcomes is essential. However, this evaluation would involve the patients of the service and would have different study design, that can be developed in future studies.

The instrument used to evaluate the quality of care of the SAMU was the Pre-Hospital Care Quality Rating Scale (AQ-APH), developed based on an integrative review and previously validated [10].

The AQ-APH scale has 17 items that assess Quality of Care (QC), with 08 items related to the structure (ambulance status, physical structure, ambulance comfort, ambulance patient safety, material resources, safety of the staff in the support centers, permanent education) and 09 items related to the process (access, reception, humanization, response time, respect for patients' privacy, service orientation, opportunity of the patient in claiming and multi-professional articulation [10].

For each item, the professionals assigned a point of the Likert scale as follows: very bad (1); bad (2); regular (3); good (4) and excellent (5).

For the composition of the scale score, the points obtained in each item were added. For the items related to the structure, the score ranged from 8 to 40 points. For the items related to the process, the score ranged from 9 to 45. The total scale score ranged from 17 to 85 points.

In this study, it was opted to define a cut-off point for the full-scale score and a cut-off point for the items composing the structure and process aspects, based on the National Health Services Assessment Program [11] considering 70% parameter as adequate for health assessment studies (Table 1).

Thus, the structure was classified as "adequate" when the score obtained was greater or equal to 70% of the total score (≥ 28 points) and inadequate when the score was less than 70% of the total score (<28 points). Likewise, the process was classified as

**Table 1.** Representation of variables, according to quantitative, qualitative classification and statistical analysis. Natal/RN, Brazil. 2015.

Classification								
Study variables								
Structure	8 to 40 points	≥ 28	< 28					
Structure	6 to 40 points	Adequate	Inadequate					
Process	0 to 15 points	≥ 32	< 32					
FIOCESS	9 to 45 points	Adequate	Inadequate					
Structure and	17 to 95 points	≥ 60	< 60					
Process	17 to 85 points	Adequate	Inadequate					
Statistical analysis								
Descriptive	Average and Standard Deviation (SD)	Absolute and relative frequency						
Inferential	Mann-Whitney test	Chi-square and Fisher Exact test (p-value < 0.05)						

"adequate" when the score obtained was greater or equal to 70% of the total score (≥ 32 points) and "inadequate" when it reached a score lower than 70% of the total score (<32 points).

The "adequate" service was considered when the score was greater or equal to 70% of the total score (≥ 60 points) and "inadequate" for scores lower than 70% (<60 points) to classify the total scale score.

Besides to classifying the structure and process and the total scale as "adequate" or "inadequate," the data were analyzed according to the professional training (nurses, doctors, nursing technicians and drivers) and educational level (middle level – nursing technicians and drivers; and higher level – nurses and doctors).

The data collected were double typed in the Microsoft Excel program and then imported into the Statistical Package for the Social Sciences (SPSS) (version 22.0 for Windows), in which they were tabulated and analyzed by descriptive and inferential statistics and presented in tables.

The research followed the Resolution 466 and obtained prior authorization from the institution for data collection. The project was approved by the Research Ethics Committee of the Onofre Lo-

pes University Hospital (HUOL) of Natal/RN, under protocol n° 437/2010 and CAAE: 0025.0.294.051-10 and the participants received information about the objectives of the study and signed the Free and Informed Consent Term in two copies.

#### Results

The results are presented in three stages: personal and professional characterization of the SAMU team, general evaluation of the structure and process items, and evaluation of structure and process indicators according to professional category and level of education.

Regarding personal characterization, most of the participants were drivers (49.2%), between 31 and 40 years old (45.3%), with a high school education (44.7%) and married/stable union (52.5%).

Regarding the professional characterization, all of them (100.0%) had less than five years of service in the institution, and most of them (55.9%) had less than five years of experience in the emergency area. Most of the participants stated that they liked to work in the institution (88.3%), had another working relationship (55.3%), had a weekly workload of 30 to 40 hours (54.7%), participated in training for Emergency situations (98.9%) in the last 6 months, valorizing in-service training (83.2%), having a good attendance in training (87.2%) and feeling the need for more emergency training (96.6%). **(Table 2)**.

**Table 2.** Assessment of the quality of care according to the structure and process indicators, Rio Grande do Norte, Brazil, 2015. (n=179).

Quality Indicators	_	bad/ ad	Re	gular	Good/ Excellent		
	Ν	%	Ν	%	Ν	%	
Structure							
Ambulance maintenance status	104	58.10	66	36.87	9	5.03	
General physical structure of the service	29	16.20	63	35.20	87	48.60	
Comfort inside the ambulance	100	55.87	62	34.64	17	9.50	

Quality Indicators	_	/ bad/ ad	Reg	gular	Good/ Excellent	
	Ν	%	Ν	%	Ν	%
Structure						
Availability of material resources	19	10.61	25	13.97	135	75.42
Safety for the patient inside the ambulance	49	27.37	50	27.93	80	44.69
Safety for the professional	133	74.30	36	20.11	10	5.59
Permanent education	3	1.68	7	3.91	169	94.41
Safety demonstrated by professional staff	7	3.91	9	5.03	163	91.06
Process						
Access to servisse	17	9.50	51	28.49	111	62.01
Reception	5	2.79	15	8.38	159	88.83
Humanization	8	4.47	22	12.29	149	83.24
Response Time	11	6.15	20	11.17	148	82.68
Patient Privacy	7	3.91	20	11.17	152	84.92
Guidance on care	14	7.82	17	9.50	148	82.68
Relationship between the professional and the patient	9	5.03	33	18.44	137	76.54
Patient Opportunity to Complain	25	13.97	50	27.93	104	58.10
Multi-professional articulation	18	10.06	37	20.67	124	69.27

The evaluation of the quality indicators showed that some items of the structure were evaluated as very bad/bad by a great part of the study participants, with emphasis on the state of conservation of the ambulances, ambulance comfort and safety of the professionals. On the other hand, all the process items were considered good or excellent by most participants (Table 3).

The comparison of the scores of the quality indicators according to the level of education and professional category showed that all the professionals considered the structure as inadequate, since all the average scores were below 28, regardless of the professional category.

Among middle-level professionals, nursing technicians were more judicious in assessing the structure, evidenced by the significant difference observed among the middle-level categories ( $\rho$ =0.000). Among higher level professionals, nurses evaluated the structure more negatively about physicians. However, there was no significant difference between these two groups of professionals.

Regarding the process indicators, all the professionals considered the appropriate items (a score greater than 32). The higher level is more rigorous in this evaluation when compared to the middle level.

In the evaluation of the structure and process items together, middle-level professionals evaluated the service as adequate, despite the significant difference between drivers and nursing technician's averages ( $\rho$ =0.007). On the other hand, higher level professionals evaluated the SAMU 192 RN as inadequate, since the averages were below 60. **(Table 4)** 

The analysis by level of education revealed that the structure was assessed as inadequate by both professionals at the secondary level and by higher education professionals, with averages below 28. Regarding the process, both levels of education considered it adequate, once the averages obtained were above the established limit of 32. It should also

**Table 3.** Evaluation of the quality of the assistance through the indicators of structure and process in the point of view of the professionals, by professional category, Rio Grande do Norte, Brazil, 2015. (n=179)

	Middle Level					Higher Level				
Variables	Driver		Nursing Technician		n*	Nurse		Physician		n*
	Average	SD	Average	SD	p*	Average	SD	Average	SD	p*
Structure	26.81	3.87	24.34	3.23	0.000	24.18	4.92	25.29	2.99	0.299
Process	37.17	4.76	36.16	3.91	0.156	32.55	4.08	32.13	5.66	0.887
Structure and Process	63.98	8.15	60.50	5.82	0.007	56.73	7.62	57.42	7.52	0.656
*: Mann-Whitney test.										

**Table 4.** Evaluation of the quality of the assistance through the indicators of structure and process, according to the level of education, Rio Grande do Norte, Brazil, 2015. (n=179)

Variables	Middle I	evel	Higher L	evel	n*	General		
	Average	SD	Average	SD	b	Average	SD	
Structure	25.85	3.82	24.94	3.66	0.135	25.67	3.79	
Process	36.78	4.46	32.26	5.16	0.000	35.89	4.93	
Structure/ Process	62.63	7.50	57.20	744	0.000	61.56	7.78	
*: Mann-Whitney test.								

be noted that higher level professionals were more judicious in the evaluation of the process, showing a significant difference in the scores obtained in the evaluation of the professionals of the middle level  $(\rho=0.000)$ .

If they are considered together, the indicators of structure and process were evaluated as adequate by the professionals of average level (average over 60) and inadequate by the higher level professionals (average below 60), with a significant difference between them ( $\rho$ =0.000).

Finally, although some items received a negative evaluation, the general average score, including the total scale and assessment of all professionals, indicated that the quality of the SAMU 192 RN is adequate (average over 60).

# Discussion

The characteristics of the professionals of the SAMU 192 RN confirm other research carried out in Brazil, with predominance of professionals of economically active age, married/stable union, and with the complete secondary education, since it is normative the entrance of people in health services with vocational technical or higher education training courses [12, 13].

The analysis of the professional characterization of SAMU 192 RN workers is similar to data found in a study on mobile APH, carried out in Ribeirão

Preto/SP and Fortaleza/CE, in which the predominance of professionals with exercise time in the lower institution was five years (65.0%) and with another employment relationship (62.5%). Regarding the professional category, a similar survey conducted in Belo Horizonte/MG showed that nursing technicians/assistants (47.5%) and drivers of emergency vehicles (27.7%) prevail in the studies [13, 14].

The attendance, valorization and frequency of these professionals in the training is given by the presence of a Permanent Education Center (NEP), composed of: 03 nurses, 01 doctor, 03 nursing technicians and 03 drivers, who monthly publish for all professionals an agenda training in the various emergency situations focused on the APH.

In the evaluation of the results related to the structure of the service, the negative evaluation regarding the state of conservation of ambulances, comfort in ambulances and the safety of professionals is highlighted. The sense of insecurity can be explained by the increase in violence in Brazil, which is not limited to large cities and affects cities in the interior. A study carried out in Chile with nursing professionals of a mobile emergency service showed that one of the most stressful aspects of the service is the care of patients outside a health unit since working on the public highway involves the risk of being run over and violated [18].

Also about the structure, a study carried out in Fortaleza/CE also found dissatisfaction with the multi-professional team with the physical structure of the service and the situation of the ambulances, similar to the findings of this study [13].

In a study carried out in Fortaleza/CE, 71.4% of the physicians, 42.1% of the nurses, 70.0% of the nursing technicians and 62.5% of the drivers stated that the physical structure and the state of ambulances were compromised, hindering to assist patients [13].

Studies [19, 20] have stated that emergency teams are constantly in contact with the unpredictability,

the severity of patients' situations and the limitation of human, material and structural resources, greatly influencing the quality of care provided.

Research carried out in two emergency services and emergency risk classification in Maringá/PR, evaluating the aspects of structure, process and outcome, from the Donabedian's point of view, also identified deficits in the physical structure of the service, directly implicating the quality of care provided by professionals [21].

A multicenter study carried out in five Brazilian capitals - Recife/PE, Manaus/AM, Brasília/DF, Rio de Janeiro/RJ and Curitiba/PR - on the implementation of mobile APH system showed that only Rio de Janeiro meets the physical structure and availability of ambulances, according to Administrative Rule N° 2,048/GM [22].

Despite the negative evaluation in some structural aspects, other structure indicators were evaluated positively by the team, such as the general physical structure of the service, availability of material resources, safety for the patient inside the ambulance and permanent education. The good evaluation of the permanent education is justified by the presence of an active and accessible NEP. Besides this positive point, the physical structure of the service was also well evaluated for having undergone a reform with the environments more welcoming.

The process quality indicators received, in general, a positive evaluation. However, it was observed that higher-level professionals (nurses and doctors) were more judicious in this evaluation than the middle-level professionals, which was expected.

A national study [13] on the adequacy of a municipal SAMU corroborates the findings of this study since it also identified that medical professionals and service nurses were more demanding regarding the evaluation of items important to the work process of the service.

The process indicators that obtained the best evaluations of the professionals were: reception, humanization, patient privacy, response time and guidelines on care. It is believed that these aspects reflect the work of the Permanent Education Center of SAMU 192 RN, of the psychology team that works on the mental health of professionals, as well as aspects related to the study of ethics, teamwork processes, respect for individuality and The Charter of the Rights of Health Users.

Research [23] complements that it is the right of every citizen to receive a quality public service in the health area. The Ministry of Health launched in 2000 the National Humanitarian Assistance Program (PN-HAH) to guarantee this right, and to spread a new culture of humanized care. This program proposes a set of integrated actions that aims to change the patient assistance standard in public health services in Brazil, improving the quality and effectiveness of the services provided.

It is worth noting that in 2004, the PNHAH was replaced by a policy with a transversal perspective that crosses the different actions and management bodies of the Unified Health System (SUS), constituting a public policy of assistance and no longer a specific program: Politics National Humanization (PNH). In this perspective, the process of humanizing refers to providing access, reception with risk classification in situations of emergency, privacy, and guidance on the care and health status of the patient [23].

However, one of the challenges is to face the working conditions faced by workers to implement the Humanization Policy: devaluation, precariousness and low investment in permanent education, a centralized and vertical management model hindering for workers to appropriate their work process [24].

The multi-professional articulation within SAMU was also well evaluated by most professionals. This indicator is recognized as an essential condition for the quality of care, so multi-professional workshops are recommended by the Ministry of Health, for the discussion and construction of actions and protocols [21].

Also, the good multi-professional articulation of SAMU is due to the meeting of the team, after each service, to discuss and rethink the environment and the work processes, collectively constructing suggestions to improve the organization, exercising a democratic management, essential model in the present day.

In the evaluation of the structure and process items together, it was noted that the SAMU 192 RN service was considered adequate by the multiprofessional team, using the parameters established in this study (average > 60). However, there are still many challenges, such as the continued implementation of this service in Brazil, the recognition of the importance of this service to the population and the guarantee of safe and quality assistance.

The evaluation of the structure and process indicators allowed exploring important issues to improve the quality of care, but this study presents some limitations that should be pointed out. It was not possible to perform the investigation of the aspects related to the outcomes, hindering to triangulate the dimensions mentioned by Donabedian (structure, process, and outcomes), which could bring a complete view of the quality of the assistance provided. This aspect should be overcome in future studies.

## **Conclusion**

It was verified that the quality of the assistance provided by the SAMU of the state of Rio Grande do Norte is inadequate in some aspects of the structure and adequate regarding the process, in the point of view of the professionals researched. The professionals of higher level (nurses and doctors) were more rigorous in the evaluation of the quality indicators analyzed.

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