

## **Quality Evaluation under the Perception of Satisfaction of the users of Different Age Groups in a Public Hospital in Natal - Brazil**

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**Abstract**

The present article endeavors to describe the levels of satisfaction of users of medical services at the University Hospital Onofre Lopes (UHOL) in different age groups and to study the association between users' satisfaction and the different types of services provided by this public health institution. The study is based on the Annual Satisfaction Survey conducted by the UHOL Ombudsman's office, which evaluates this information for health policy subsidy in this hospital. A total of 4,290 users were consulted between 2015 and 2017 divided into three age groups: adolescents, adults and the elderly. The dependent variable was patient satisfaction after medical consultation at the hospital, evaluated on a four-level Likert scale. The independent variables were Gender of respondents (G); Comfort at the reception hall (CRH); Hygiene, cleanliness and organization of the hospital (HCO); Comfort of facilities at the medical care area (CFMC); Reception Service (RS); Health team attendance (HTA); Attendance waiting time (AWT); Education Level (EL), Age (A) and Evaluation of General Satisfaction on Hospital Services (GS). The multiple linear regression and logistic regression analysis was completed, respectively, for the data in general and separately for each age bracket. Very few participants declared to be dissatisfied or very dissatisfied (4%). In the crude model, general satisfaction was associated with CRH and HCO in the adolescent group, CFMC and RS in the CRH, HCO, RS and HTA groups in the elderly group. Adolescents showed greater dissatisfaction with hospital services because they presented specific demands concomitant with their age group.

**Keywords:** patient satisfaction, health services evaluation, quality of health care, health care research, health services research, quality improvement

**Introduction**

In the last decades the debate about the quality of health services has acquired global importance; given that several countries have adopted as a priority issue the monitoring and improvement of the quality of medical care in response to notorious incidents of systematic malpractice, which harm directly between 2.9 % to 16.6% of users of medical facilities. The growing demand for more resilient health service standards is a result of the understanding that the health sector is one of the main influencers on the quality of life in society<sup>1-3</sup>.

Several quality improvement programs have been developed across many health services and systems. There are publications on this subject in various regions of the world, including India, South

America, Asia and North America. More specifically, on the topic of how to increase quality, many institutions have tried to establish guidelines and parameters for quality evaluation and improvement<sup>4</sup>.

In Brazil, the situation of health facilities is characterized by the overcrowding of hospital beds, which indicates the poor performance of public and private healthcare and emergency systems in response to the growing demand for these services. According to a survey conducted by Datafolha (2015) amongst 2,069 respondents, 60% evaluated the public health situation in Brazil between terrible and bad<sup>5</sup>. Within this specific sample space, 54% stated that health should be the priority area of government investment<sup>6-8</sup>.

Given the importance of the topic, it became popular in Brazil since the 1990s to conduct investigations using a satisfaction survey methodology, driven by the democratic achievements that ensured the strengthening of the Unified Health System (SUS) and the community participation in its planning and control<sup>9-13</sup>. This approach can be observed in both national as well as regional studies, the latter being in greater numbers<sup>13-17</sup>. This methodological approach was already common in other countries such as England and the United States since the 1970s, given the established context of a culture of quality<sup>8,18</sup>.

According to Dorigan and Guirardello the evaluation of user satisfaction is adopted by hospitals and other health institutions as a strategy to understand the factors that influence the perception of quality from the patient's perspective<sup>19</sup>. Therefore, knowing the patients' needs does not only contribute to the improvement of the quality of care, but also, in the managerial scope, it works as an important indicator to the maintenance of the health institutions' competitiveness<sup>20,21</sup>.

The debate about quality in medical services indicates a recurring difficulty in holistically measuring health service performance based on objective criteria. Satisfaction research is still a common way to measure the perception and expectation of the users regarding the medical services provided, even though it is subject to inconsistencies such as the "lifting effect" – in which surveys tend to inflate the patients' level of satisfaction<sup>22-24</sup>.

Garvin evaluates that there are five approaches to defining quality, one of which is consumer-based, which comprises quality as directly linked to the subjective and personal view of each customer, wherein the understanding and subsequent satisfaction of their preferences would determine the product or service as being of high quality<sup>25</sup>. Campos furthers the discussion by defining that a product or service of quality must perfectly meet the conditions of reliability, accessibility, safety and conformity<sup>26</sup>.

With regards to quality in health service, it is understood that patients expect, in addition to what is said by the classic approach, a humane treatment and empathic communication with health professionals in order to be fully satisfied. It's been verified that the satisfaction of the users is related to the technical skills, the knowledge and the individualization of the treatment provided by the health agents. All this demonstrates that factors involved in patient care such as the accessibility, reception and structure of the hospitals are considered as relevant to the general satisfaction of the patient as the effectiveness of the cure provided<sup>8,18,27</sup>.

By seeking to include the users (patients) as the evaluation agent for the quality of the health service, satisfaction indicators that are sensitive to their needs are obtained, which induces health service providers to promote substantial changes in their policies. Thus, the satisfaction survey is efficient in helping managers to identify improvement points in their facilities and critical points within the process from the perspective of their main stakeholders, the users<sup>10,28,29</sup>.

Following this premise, the University Hospital Onofre Lopes (UHOL), located in Natal, State of Rio Grande do Norte / Brazil, has used satisfaction survey to improve its operational and managerial processes. UHOL is an institution that is part of the Federal University of Rio Grande do Norte (FURN) and is affiliated with the Brazilian Company of Hospital Services (EBSERH). It has a physical

area of 31,569.45 m<sup>2</sup>, offering 242 bed, of which 19 are Intensive Care Units (ICU), as well as 84 outpatient clinics and 12 operating rooms.

Endeavouring to add to the managerial knowledge of UHOL both as an educational institution as well as a provider of health care services, by shedding light upon the patients' perception regarding the health services offered by the institution; it was analysed the data collected by the satisfaction survey conducted by the UHOL ombudsman's office in the years 2015, 2016 and 2017. The study used descriptive and inferential statistical analysis of the available data and quantitative and qualitative evaluations of the responses, and has also developed from the data collected, multiple linear regressions to identify the weight of variables in relation to the general satisfaction.

## Methods

Statistical methods are useful to analyse and organize data collected from satisfaction surveys. These procedures are classified into two categories: inferential and descriptive statistics. Inferential statistics is composed of procedures that seek to understand the behaviour of a specific relation in the sample and to establish if this same relation is evidenced in a significant way in the population from which it was withdrawn. That is, given the impossibility of interviewing an entire population on a particular issue or characteristic, inferential analysis makes it possible to establish a correlation between the values found in a representative sample of a given population under study<sup>31</sup>. Descriptive statistics is the set of statistical procedures that aims to summarize and organize the sample data in order to describe its characteristics that are important to the study. In general, descriptive statistics seek to simplify a high volume of data so that it becomes as comprehensible as possible and representative of the reality in question<sup>30,31</sup>.

Linear regression analysis refers to the development of a mathematical equation that describes to some extent the behaviour of a dependent variable of interest, according to the changes of a number 'n' of independent variables<sup>32-35</sup>.

Multiple linear regressions differ from simple linear regression precisely by adopting two or more independent variables for the explanation of the phenomenon studied. Logistic regression is a statistical technique that aims to model, from a set of observations, the 'logistic' relationship between a variable dichotomous response and a series of numerical (continuous, discrete) and / or categorical explanatory variables (36). Thus, linear and logistic regression has the following configuration:

$$Y_i(X) = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \dots + \beta_p X_{ip} + \epsilon_i \quad (1)$$

$$G_p(X) = \ln\left(\frac{\pi(X)}{1-\pi(X)}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_p X_p + \epsilon_p \quad (2)$$

Where:

$Y_i$ : Dependent variable to be predicted

$G_p$ : Logit function for model linearization

$\pi$ : Odds

$x_1 \dots x_n$ : Independent variables

$\beta_n$ : Partial regression coefficients

$\beta_0$ : Constant

$\epsilon$ : Error or disturbance

## Ethics Approval and Consent to Participate

The research project was approved by the Ethics Committee of the Onofre Lopes University Hospital (CEP / UHOL), registered with CAAE (Certificate of Presentation for Ethical Appreciation). 55277467.4.0000.5872, and the collection was made after the letter of agreement was issued and appreciation of CEP/UHOL.

During the period from 2015 to 2017, 4,290 questionnaires were applied by EBSE RH Ombudsman's office on users of outpatient services and hospitalization at UHOL. The questionnaire prepared by EBSE RH consists of 13 questions, divided into three sessions: (I) Identification of the respondent and characterization of the service provided; (II) Individual evaluation of hospital and service aspects; (III) Overall assessment of satisfaction.

The questionnaire sessions were comprised of the following questions: (I) interviewee's age, gender, schooling, service used in the hospital, specialty of care; (II) comfort at the reception desk; hygiene, cleaning and organization; comfort of facilities in the medical care area; front desk; care of the health team; waiting time for the attendance; (III) whether or not the patient would indicate the hospital and their overall satisfaction about the services provided at the hospital. Of the 13 questions that composed the questionnaire, only nine were considered for satisfaction assessment, as they had a significant impact. This cross-sectional study consisted of the descriptive and inferential statistical analyses of the data collected, followed by the formulation of a multiple linear regression equation using Excel version 2013 and Minitab.

The data analysed was annually catalogued by representatives of the EBSE RH ombudsman's office and represents the respondents' perception of the services provided by UHOL in the years of 2015, 2016 and 2017. Due to the amount of data and changes in the form applied by the UHOL ombudsman's office, the data for 2014 were not included in this study. The satisfaction survey of 2018 was not yet available for evaluation. For analysis purpose, the descriptive statistics of the data was employed as well as the development of multiple regression equations in the relevant years. There was also an evaluation by age group of the respondents. That information will be presented on a table format.

The multiple linear regression analysed the impact of the nine variables: Respondents' gender (G); Comfort at the reception hall (CRH); Hygiene, cleanliness and organization of the hospital (HCO); Comfort of facilities at the medical care area (CFMC); Reception Service (RS); Health team attendance (HTA); Attendance waiting time (AWT); Education level (EL); Age (A); Evaluation of General Satisfaction on Hospital Services (GS). These questions were represented, respectively, in the regression equation corresponding to the variables  $x_1$  to  $x_9$ . To make the regression equations explicit, it was necessary to convert the qualitative weight of the respondents into quantitative data.

Thus, values 1 and 2 were assigned to the female and male respondents, respectively; the values 1, 2, 3, 4 and 5 were attributed to the affirmations Terrible, Bad, Regular, Good and Great, respectively, as to analyse the variables CRH, HCO, CFMC, RS, HTA and AWT. The values 1, 2, 3, 4 were attributed to the weight Unsatisfied, Little Satisfied, Satisfied and Very satisfied respectively, in order to analyse the variable GS. Table 1 presents the adjustment indicators of the multiple linear regressions.

**Table 1:** Multiple Regression Statistics

Regression statistics to evaluate the regression equations (2015 to 2017)			
Statistical indicators	2015	2016	2017
R-Multiple	0.98975	0.98542	0.98818
R-Squared	0.97961	0.97105	0.97651
Adjusted R-Squared	0.97898	0.97004	0.97552
Standard error	0.44584	0.53642	0.52764
Observations	1,835	1,237	1,215
F Test	0.00	0.00	0.00
Significance Level ( $\beta$ )	0.05	0.05	0.05
Confidence Interval( $\alpha$ )	0.95	0.95	0.95

From Table 1, it is possible to observe that the regressions' R-Squared is close to the value of one, indicating that the equations explain, respectively, 97,96%, 97,10% and 98,81% of the studied phenomenon. As to deepen the analysis regarding the quality of the regressions, the values and *F*-Test were observed and in the presented scenario are lower than the significance level, which indicates that at least one of the studied independent variables do impact on the dependent variable. The confidence interval and the significance level considered for the study were respectively 95% e 5%.

## Results

Table 2 explains that, in general, the perception of users regarding the health services provided by UHOL is predominantly great or good. These considerations highlight the attendance of the health care teams (56.39% of the users stated that they consider this service to be Great). Still regarding table 2, the variable Attendance waiting time (AWT) stands out within the regular, bad and terrible weight. Amongst the adults, the majority were female (67%) and 52% had a primary and secondary level of education.

**Table 2:** Weight assigned by users to the questions per age group (per year)

Percentage of users' satisfaction according to the weight presented in the UHOL survey between 2015 to 2017 (%)						
Users' perception -2015 [1.839]	CRH	HCO	CFMC	RS	HTA	AWT
Great	22.06	23.09	27.61	27.72	41.23	8.17
Good	55.45	55.28	60.40	59.86	52.83	31.15
Regular	17.76	17.76	10.51	9.64	5.28	35.84
Bad	3.32	2.61	1.14	1.58	0.49	15.03
Terrible	1.42	1.25	0.33	1.20	0.16	9.80
Users' perception - 2016 [1.238]						
Great	31.42	34.25	43.13	44.75	65.27	12.12
Good	47.17	48.63	51.21	46.69	33.04	33.93
Regular	18.09	13.41	5.33	7.43	1.78	35.62
Bad	2.02	2.34	0.32	0.65	0.24	12.68
Terrible	1.62	1.70	0.32	0.81	0.00	5.98
Users' perception - 2017 [1.216]						
Great	28.95	35.77	50.58	48.68	70.31	19.16
Good	48.93	43.75	44.74	43.26	27.06	31.99
Regular	17.76	16.61	4.36	6.50	2.47	33.39
Bad	2.06	2.14	0.08	0.74	0.16	9.62
Terrible	2.30	1.73	0.25	0.82	0.00	5.84
Users' perception - Overall [4.290]						
Great	26.69	29.91	38.60	38.55	56.39	12.40
Good	51.14	50.00	53.22	51.28	39.74	32.17
Regular	17.86	16.18	7.27	8.11	3.47	35.06
Bad	2.59	2.40	0.61	1.07	0.33	12.80
Terrible	1.72	1.52	0.30	0.98	0.07	7.58

Amongst the elderly, 58% were female and 67% were not literate or declared themselves functional illiterate (able to read a simple ticket). Amongst the adults, the majority was female (67%) and 52% had a primary and secondary level of education. Adults and the elderly were the age groups that presented predominance in the use of (UHOL) health services (80% and 17.5%, respectively). The multiple regression equations 3, 4 and 5 for each year were elaborated and their coefficients demonstrate the significance of each variable in relation to the users' general satisfaction.

$$Y_{2017} = 0,06219X_1 + 0,05005X_2 + 0,11499X_3 + 0,13952X_4 + 0,08557X_5 + +0,24976X_6 + 0,09806X_7 + 0,03165X_8 + 0,00034X_9 \quad (3)$$

$$Y_{2016} = 0,210652X_1 - 0,00975X_2 + 0,015256X_3 + 0,196299X_4 + 0,01221X_5 + +0,317559X_6 + 0,00942X_7 + 0,0362X_8 + 0,005463X_9 \quad (4)$$

$$Y_{2015} = 0,11024X_1 + 0,11896X_2 + 0,05452X_3 + 0,13847X_4 + 0,08414X_5 + +0,19579X_6 + 0,05381X_7 + 0,040776X_8 + 0,00373X_9 \quad (5)$$

From the equations above it is possible to evaluate that there was a change in users' perception referring to the factors that influence the general satisfaction in the course of time. Based on Table 1, it is possible to state that these equations satisfactorily explain the independent variable analysed in this study. The most significant variable for users' satisfaction throughout the three years of the survey was HTA.

The UHOL satisfaction survey was segmented into three groups corresponding to the age range of the patients (Table 3). The first group is consisted of adolescents between 13 and 18 years of age. The second group comprises adults between the ages of 19 and 65 and the latter group comprises the elderly over 65 years of age. In total, the survey was answered by 4,290 respondents: 103 were adolescents, 3,434 were adults and 753 were elderly.

**Table 3:** Weight assigned by users to the questions per age group

Percentage of users' satisfaction according to the type of service and the age group in the UHOL. (%)						
Questions	Great	Good	Regular	Bad	Terrible	Total
<b>Adolescents (13-18) [n = 103]</b>						
CRH	27.2	55.3	16.5	1.0	0.0	100.0
HCO	31.1	51.5	9.7	1.9	5.8	100.0
CFMC	38.8	57.3	3.9	0.0	0.0	100.0
RS	37.9	47.6	11.7	1.0	1.9	100.0
HTA	57.3	38.8	3.9	0.0	0.0	100.0
AWT	10.7	25.2	36.9	15.5	11.7	100.0
<b>Adults (19-65) [n = 3.434]</b>						
CRH	26.6	50.9	17.9	2.8	1.7	100.0
HCO	30.2	49.3	16.2	2.6	1.7	100.0
CFMC	39.3	52.4	7.4	0.6	0.3	100.0
RS	39.1	50.6	8.3	1.1	0.9	100.0
HTA	57.7	38.2	3.6	0.4	0.1	100.0
AWT	12.6	32.8	35.4	12.0	7.2	100.0
<b>Elderly (&gt;65) [n=753]</b>						
CRH	26.8	51.7	17.8	1.9	1.9	100.0
HCO	28.4	53.1	16.9	1.3	0.3	100.0
CFMC	35.5	56.4	7.3	0.7	0.1	100.0
RS	36.3	54.8	6.9	0.9	1.1	100.0
HTA	50.5	46.7	2.7	0.1	0.0	100.0
AWT	11.7	30.4	33.1	15.9	8.9	100.0

Due to the extension of adults' age range [19-65], it was identified the need to stratify this age group, which has generated five strata [19-29, 30-39, 40-49, 50-59 and 60-65]. The evaluation of users' perception from this classification, however, demonstrated that there is no significant difference between this analysis and that presented on Table 3.

This table presents the percentage of UHOL users' satisfaction for each type of service in relation to age groups (adolescents, adults and the elderly). For adolescents, the type of service that

obtained the highest percentage performance in the "Great" category was health team attendance with 57.3%. The type of service with the highest percentage in the "Terrible" category was attendance waiting time with 11.7%. In the other age groups – adults between the ages of 19 and 65 years and the elderly over 65 years of age – the evaluation followed a similar characteristic presented within the adolescent group, so that the highest percentage performance in the "Great" category was health team attendance, with 57.7% and 50.5%, respectively. As for the "bad" category, the highest percentage recorded also recurred in the attendance waiting time, with 7.2% for adults and 8.9% for the elderly.

**Table 4:** Odds ratio for assessment of variables association with general satisfaction

<b>Crude odds ratio of user satisfaction with hospital services according to type of service and age group</b>	
<b>Indicators</b>	<b>Crude OR (95% CI)</b>
<b>Adolescents (13-18) [n= 103]</b>	
CRH	1.5 (0.02 - 11.24)
HCO	1.43 (0.33 - 2.11)
CFMC	0.2 (0.01 - 2.67)
RS	0.32 (0.06 -2.97)
HTA	0.28 (0.03 -3.31)
AWT	0.35 (0.01 - 0.89)
<b>Adults (19-65) [n= 3.434]</b>	
CRH	0.97 (0.52 -1.82)
HCO	0.6 (0.35 - 1.01)
CFMC	1.04 (0.47 -2.3)
RS	1.27 (0.57 - 2.81)
HTA	0.39 (0.17 - 0.91)
AWT	0.94 (0.6 -1.49)
<b>Elderly (&gt;65) [n=753]</b>	
CRH	1.02 (0.23 -4.6)
HCO	1.48 (0.25 -8.84)
CFMC	0.27 (0.06 -1.28)
RS	1.19 (0.16 -8.93)
HTA	2.03 (0.03 - 30.61)
AWT	0.76 (0.28 - 2.05)

In the crude model (Table 4), adults' satisfaction was more closely associated with the reception service (RS) rather than Comfort of facilities at the medical care area [CFMC] (OR = 1.27, 95% CI 0.57 - 2.81). These variables had a significant impact on overall satisfaction in 2015 (Equation 3), a significant occurrence that repeats itself in 2016 with only the variable RS (Equation 4) and in 2017 with the two variables, which shows the evolution of their importance in the general satisfaction of users (Equation 5). In relation to the elderly group, only the CFMC and AWT variables did not display a strong relationship with satisfaction (OR = 0.27, 95% CI: 0.06 - 1.28 and OR = 0.76, 95% CI: 0.28 - 2.05).

## Discussion

CRH and HCO were associated with user satisfaction amongst adolescents and the elderly. Regarding the elderly, those who visited UHOL were more likely to be satisfied than the other groups. Moreover, within this group, 50.5% considered HTA as great, making this question the best evaluated by the respondents. Similar results were identified in adolescent and adult groups (57.3% and 57.7%). In our study, all groups had high levels of satisfaction.

Over 94% of respondents rated services as satisfactory or very satisfactory regardless of their age. Such result substantiates the discussion by other authors, since the elderly usually present a higher satisfaction level than any other age groups<sup>37-39</sup>. Explanations for the tendency of higher level of



satisfactions amongst the elderly include their predisposition to a more tolerant behaviour and also the fact that professionals can be more respectful and careful when serving this specific age group. It may also be a cohort effect because the elderly have lower expectations based on previous experiences or because the assessment criteria are different due to specific values within the cohort<sup>40</sup>.

Compared to the user satisfaction survey conducted in 2016, in 2017 the percentage of older people who said they were very satisfied increased. In 2016, 7% of the elderly declared themselves dissatisfied and in 2017 only 2% presented the same perception. Furthermore, the percentage of satisfied and very satisfied in 2016 were 72% and 21%, respectively, while in 2017 the figures were 61% and 37%.

Teenagers who use the public service are significantly dissatisfied. The determinants of satisfaction may differ between adults and adolescents. A plausible explanation derives from the fact that adolescents overall place more value on infrastructure, such as Wi-Fi or the amenities available in private services. Another possibility lies in the fact that public service is geared to the needs of older children and adults or provides services in a way that does not meet the social values of adolescents. If teens do not feel accepted by the health team or if their expectations are not fully met, access to the service may be more difficult. The patient-professional relationship is mentioned as a very relevant dimension of satisfaction for all age groups, but it is stronger amongst adolescents. Authors also emphasize the lack of specific attention to adolescent care and that most professionals provide the same service to all age groups.

The present study is limited since it is transversal, so we cannot be sure about the temporal order. Furthermore, there may be the "gratitude bias" because users may feel compelled to make a good assessment to maintain the treatment. The gratitude bias is the omission of questions and negative reviews from users, and is found especially in the evaluation of public hospital services. However, given that the interviewer is not part of the care team and that it is household survey, the chances for such bias are considerably reduced.

Moreover, there is no consensus on a gold standard instrument for measuring user satisfaction in health care. As satisfaction depends on the characteristics of the user, service and provider, this local-based analytical study can be replicated by other university hospitals of the EBSEH network, given that satisfaction surveys happen in all other health care facilities administered by this company and the results can be useful for deliberation of health policies within these institutions.

The services offered by UHOL focus more on issues closely related to adults and the elderly and not the adolescent public, which has specific demands. Our findings indicate the need to further evaluate adolescents' perspectives. Multidimensional and population instruments should be developed to assess users' satisfaction, as to understand the particularities amongst the services offered and improve each dimension of satisfaction and care.

## Conclusion

The present work succeeded in analysing the data provided by the EBSEH, using descriptive and inferential statistical tools as well as developing a multiple linear and logistic regression model. Based on these analyses, it is possible to conclude that Onofre Lopes University Hospital's users are satisfied with the outpatient services provided, as the percentage of evaluations related to "Satisfied" and "Very Satisfied" are equivalent to 93%, 95% and 94% in the years 2015-2016, and 2017, respectively.

Furthermore, it was observed that there is a need for improvement of the hospital operations specifically related to the AWT variable. In 2015, 2016 and 2017, 60.67%, 54.28% and 48.85% of the interviewees evaluated this issue between regular and terrible. Such perception is closely linked to the daily reality of the hospital.

UHOL is qualified to perform procedures of significant complexity, such as cardiovascular and neural surgeries. However, due to the high demand for less complex clinical procedures, its attendance capacity is considerably reduced, which has an increasing impact on the attendance waiting time.

For future research, it is necessary to analyse the satisfaction survey data in all university hospitals of the EBSEH network, given that hospital policies can be defined based on users' perspectives. The most likely obstacle to the development of such work is the unavailability of users' perception data on an open platform.

Future proposals may also contribute to defining the criteria that are applied to determine the patient's position in the surgical queues. Managing such queues efficiently would positively impact on the attendance waiting time, particularly for serious cases.

### **Conflict of Interest**

The authors declare that they have no competing interests.

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