ARTICLES

Policy Effects on the Quality of Public Health Care: Evaluating Portuguese Public Hospitals' Quality through Customers' Views

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Abstract: *In this paper, public health care administration issues are reviewed and public hospital patients' views on quality of health care are empirically tested. The purpose is to support the recommendation of new public policies that lead to better performance, if necessary. Hospital patients' views on service quality were assessed through a questionnaire to estimate a global customer satisfaction measure. We argue that customer satisfaction should be measured through multiple indicators, as a latent variable. Thus, we considered the latent segment models (LSM) approach to assess customer service satisfaction. We found a two-segment latent structure: segment 1, the satisfied, with 48 percent of patients, mostly male and middle-aged patients; and segment 2, the unsatisfied, with 52 percent of patients, mostly female and youngest/oldest patients.*

Keywords: *public administration; public policies; health care evaluation; patients' views; latent segment models; customer satisfaction; Portugal*

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INTRODUCTION

In the following article, we review recent developments in public health care administration, and we present a tool that public administrators/managers can use to identify typologies in public administration issues in general and health care issues in particular. That tool is used to answer the question, *to what extent patients* (and customers in general) *are satisfied with the conditions offered by public health organizations*, through the classification of patient satisfaction into segments, according to certain attributes.

The problem

There is poor evidence on health care quality in Portuguese public hospitals. Furthermore, public reporting on health care quality has led to few or no effects. Taking Portugal's case, much research is needed to define a measurement standard of health care quality in public hospitals. And much is needed to refine that measurement standard in order to advance our understanding of health care quality in public hospitals.

Framing the study as an evaluation of public health care service quality through customers' views, we have formulated the following research questions:

RQ1: Is there homogeneity in customers' views concerning public health care service quality?

RQ2: How is the quality of Portuguese public health care service assessed by costumers?

Importance of the problem

Citizens' social participation is reflected in the interaction between citizens and decision makers related to public policies. That interaction is essential when government has substantial influence on policies to promote better quality of life. In fact, the opportunity for citizens to be part of public decision-making processes will promote the strengthening of the welfare state, we hope. On many issues of public administration, administrators/managers often want to measure and quantify several factors. Therefore we need to use the best models in order to obtain a better understanding and hence shape these phenomena.

Following Lohr (1992), quality is "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes

and are consistent with current professional knowledge". There is still great interest in characterizing hospitals that provide better or worse care and in using that information in some way to improve health care (Keeler et al., 1992). The safety of patients is an important responsibility of health care providers, and significant compensation costs may arise if providers are negligent (Fenn et al., 2010). Nowadays, public hospitals are facing multiple challenges, mostly because governments have increasingly mandated the containment of rising hospital costs (Aiken, Clarke & Sloane, 2002). However, there has been a move away from assessing costs and activity to assessing quality, with an emphasis on both efficient use of resources and on the effectiveness of health care (Campbell, Roland & Buetow, 2000). Additionally, a range of managerial reforms have been undertaken to improve productivity in the hospital sector (Aiken, Clarke & Sloane, 2002), and these initiatives have taken different forms such as vertical and horizontal integration of services, mergers, and regionalization of services.

A research agenda for further work has been identified, and recommendations have been made to enhance the theoretical and methodological quality of studies concerning public service improvement (Boyne, 2003). In Portugal, the quality of public health care is on the national agenda, and much of the interest in the issue has developed in response to the dramatic transformation of the health care system in recent years. Recent reforms in Portugal were aimed at strengthening the role of primary care, and at improving the quality of the health care system. Since 2006, new policies were designed to change the organization and strengthen the structures and the funding of primary care, thus promoting the evolution of traditional primary care centres into a new type of organization – *family health units* (Fialho et al., 2011). Several problems have already been identified: (i) small and inadequate numbers of practitioners/family doctors (GPs) in some regions, together with the retirement of a growing number of GPs; (ii) a high number of people not registered with a GP (10.6%); (iii) high dissatisfaction of patients and doctors with primary care provision; and (iv) overuse of hospital emergency services due to difficult access to primary care services (Fialho et al., 2011).

This overuse of hospital emergency services becomes a great problem since a growing number of doctors, nurses and support staff retire without being properly replaced. The situation is further worsened by the flight of doctors, nurses and support staff to private health care organizations, with better remuneration systems.

Recent surveys of consumers focusing on their most recent hospitalizations as well as the quality, availability, and affordability of health care in five countries found substantial public dissatisfaction with health care (Aiken, Clarke & Sloane, 2002). The same has been reported for Portugal (Fonseca, 2013a).

This study aims to empirically test public hospital patients' views on quality of health care in order to recommend, if necessary, the adoption of new public policies that lead to better performance. In particular, we want to know whether the results obtained by Fonseca (2013a) have improved after potential adjustments in public health care policies. Global patient satisfaction is influenced by several quality dimensions (Fonseca, 2013a). For comparison, this study also focuses on the dimensions of technical quality, functional quality, and corporate image.

PUBLIC ADMINISTRATION AND PUBLIC HEALTH SERVICE QUALITY

In the twenty-first century, there is much for public administration to do beyond the mandate of achieving efficient mechanisms for service delivery, namely by creating a public administration that governs in the interest of the people in a time of significant change in the public sector (Box et al., 2001).

According to Levy (2003), over the past two decades, the New Public Management (NPM) paradigm has largely influenced the modernization of public administration systems in OECD countries. The traditional Weberian model of public administration, conventionally centralized, led by rules and procedures, bureaucratic and legalistic bent and guided by an ethos of public service (Levy, 2003), has undergone a process of NPM reform to embrace private sector management rules and values. NPM includes a focus on customers and a belief in market mechanisms, the fragmentation and decentralization of public services and the transformation of working practices within them (Hood, 1991).

To have a transparent management, there should be adequate information for citizens to participate effectively and exercise their oversight function, thereby contributing to the public agenda and improving democracy. Assessments allow us to analyze whether existing policies and programs comply with the guiding principles of the agenda, the need to change in the medium term, and the requirement of short-term changes to improve performance.

Within a governance framework, the use of public-private partnerships for policy has been pointed out as indicating the willingness of a government to develop other means of coupling and implementing policies (Peters, 1998). However, following this author and in accordance with the critics of the public service, the result has been extensive inefficiency, organizational slack, economic complacency, obsession with the processes, and lack of sympathy to clients' needs.

Over the past twenty-five years the provision of goods and services by local government has undergone great change. In fact, quasi-markets have replaced the traditional institutions of progressive reform government (Lowery, 1998). Consequently, the author suggests that theories of market and nonmarket failure may explain why institutions fail to satisfy consumers' preferences.

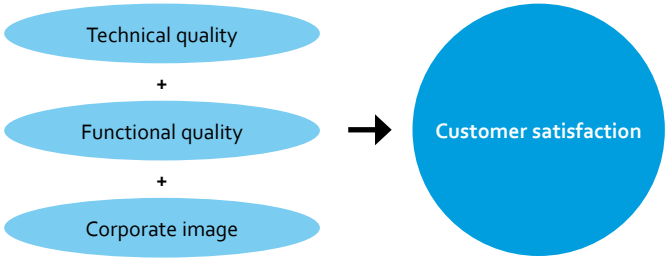
It is now widely recognized that service quality has been an important issue for both health care providers and marketers. Recent research on service quality has contributed to the success of the practice of health care (Wathoni & Rahayu, 2014). However, service management strategies applied by service firms have been rarely recognized as possible strategies (Chung, 2001).

Regularly, private and public administrators/managers want to know to what extent their customers are satisfied in order to define a marketing strategy or for organizational development purposes. In our view and bearing in mind the research conducted by McAlexander, Kaldenberg & Koenig (1994), service quality can have a significant effect on patient satisfaction, albeit these are distinct constructs (Dabholkar, 2000). In fact, Spreng and Macoy (1996) found empirical support for considering customer satisfaction as a consequence of service quality, and Dabholkar (2000) proved that customer satisfaction is affected by service quality. However, service quality is difficult for customers to evaluate (Ueltschy et al., 2007), because it has an intangible nature (Hong & Goo, 2004, cited by Ueltschy et al., 2007). Professional services are even more difficult to assess because professionals play a leading role in delivery, thereby increasing the level of variability in service quality (Ueltschy et al., 2007).

Since it is difficult to measure customers' expectations of service quality (are they able to have expectations about new services?), quality refers to the extent of compliance with a service design or a service specification (Fonseca, 2009). The quality of service is to ensure that the outcome delivered to the client meets defined specifications or design. As a consequence, from the service point of view, customer satisfaction serves to monitor the quality of service delivery, thus measuring how well the organization is providing the service (Fonseca, 2009; Fonseca, 2013a). To conclude, when customers are assessing service quality they express their satisfaction with that service. We can use the conceptual model tested by Fonseca (2009) for customer satisfaction measurement (Figure 1).

According to Fonseca (2009), services can only be experienced and, unlike goods, they are produced and consumed at the same time. In the course of a service encounter, customers' perceptions of service quality are influenced by three main factors: 1) technical quality (what the supplier delivers), the result of know-how available in the organization and evaluated by objective assessments; 2) functional quality (how the supplier delivers; staff appear to be a key element in the service encounter, in particular their capacity to answer or solve customers' problems) (Bodet, 2006); and 3) the corporate image (of the organization which delivers the service, and of the supplier).

Figure 1 Conceptual model



Source: Fonseca (2009), Fonseca (2013)

Customer orientation has gained increased attention in health care (Oja, Kouri & Pakarinen, 2006) and the need for innovation, undeniable in most sectors, appears to be even greater in the case of hospitals (Caccia-Bava, Guimaraes & Guimaraes, 2008). In fact, patients' opinions are important to the service quality issue and play a key role in quality evaluation (Wilde-Larsson & Larsson, 2009), and consequently in customer satisfaction evaluation. The patients' perspective is increasingly being considered in the process of improving health care systems (Rahmqvist & Bara, 2010). However, such studies are not common in Portugal and this paper aims to eliminate the gap.

METHODS AND DATA

There are many complexities in impact evaluation (Bjurulf, Vedung & Larsson, 2012). After identifying the intervention to evaluate, one of the obstacles is to determine which component, or set of components, influences the results. In our view, a mixed methods approach may help surpass this hurdle. But for the time being, we have made progress with a quantitative methodology. Later it is our intention to resort to mixed methods. This research was designed to determine to what extent Portuguese patients are satisfied with the conditions offered by public health organizations. In view of the complexities involved in service quality evaluation and in impact evaluation, public administrators/managers should focus on the best models for those purposes. We argue that latent segment models are particularly suitable for assessing health care pro-

viders' service quality (Fonseca, 2013a; Fonseca, 2013b; Fonseca, 2009), because these models use information criteria for model selection (Fonseca and Cardoso, 2007).

The main hypothesis is: the majority of patients of Portuguese public hospitals are dissatisfied with the quality of public health service.

Participants

The size of a random sample with a confidence level of 0.95 and a margin of error equal to 0.04 would be approximately 600 participants. In order to minimize the error, a larger sample was obtained. The questionnaire was administered to 750 patients randomly selected through a cluster sampling plan (the three clusters surveyed were the three public hospitals selected for this research). Then we proceeded to the systematic sampling of patients in each hospital. Proportionally, we selected 300 patients from hospital 1, 250 from hospital 2, and 200 from hospital 3. The population of a survey is the set of elements with the same characteristics. At the same time, health policies are common to all Portuguese public hospitals. For that reason, in a quantitative approach, this sample may be considered representative of Portuguese public hospitals patients.

Measures and covariates

The most traditional indicators, mainly univariates, give us only a partial view of the phenomena at question. In fact, they are not very useful to influence policy makers and policy processes. Currently, on the issue of service quality, public administrators/managers need an overall indicator obtained from a set of factors which influence service quality, rather than an indicator for each factor.

The overall performance of public hospitals is the context of this research, therefore its main focus is on customer satisfaction in terms of global evaluation of services provided by hospitals. That is supported by Anderson, Fornell & Rust's (1997) arguments. Our main goal is to create a typology of customer satisfaction with public hospitals based on patients' views on hospital service quality, as displayed in Table 1. This may be useful for Portuguese public hospitals' marketing and organizational development strategies. The measured variables were divided into three main dimensions: a) technical quality, b) functional quality, and c) corporate image, and we used sex and age as covariates to refine the typology.

We argue that a better understanding of the phenomenon under study can be achieved through a mixed approach, by merging qualitative (quantitative) data with quantitative (qualitative) analysis. We use qualitative (focus group) and quantitative (questionnaire) methods for collecting data, and qualitative (content analysis) and quantitative (latent class models) methods for data analysis. The outcome of the qualitative analysis was useful for designing the quantitative data collection instrument (questionnaire). It was also useful for interpreting the outcome of the quantitative analysis (latent variable). As a consequence, a mixed methodology was used in this research, in accordance with Fonseca's (2011) approach to retail market research. According to Bazeley (2009), researchers from different epistemological traditions can develop qualitative and quantitative analysis in a mixed research approach.

A questionnaire concerning the perceived quality of health care was administrated to patients in out-patient medical care. The aim was to determine whether or not the patients' views on hospital quality are homogeneous, thus constituting only a segment. Survey procedures were based on the ethical code of the International Statistical Institute (ISI), and norms and responsibilities of this professional organization were followed.

Table 1 The survey variables

Main areas	Services	Scale
Technical quality	Secretaryship and support personnel 1	1 = very bad; 2 = bad; 3 = satisfactory; 4 = good; 5 = very good
	Secretaryship and support personnel 2	
	Secretaryship and support personnel 3	
	Organization functioning 1	
	Organization functioning 2	
	Organization functioning 3	
Functional quality	Waiting room conditions 1	
	Waiting room conditions 2	
	Waiting room conditions 3	
	Medical room conditions	
Corporate image	Doctor teams 1	
	Doctor teams 2	
	Doctor teams 3	
	Nursing 1	
	Nursing 2	
	Nursing 3	
	Other professionals 1	
	Other professionals 2	
	Auxiliary staff	
Socio-demographic covariates	Sex	1 – Female; 2 – Male
	Age	Less than 12 years old; 13 to 18; 19 to 29; 30 to 46; 47 to 64

Data analysis techniques

The choice of an estimation approach comprises both theoretical and practical issues of estimating multivariate models involving categorical attributes. Our conceptual model allows us to argue that in order to estimate a global measure of customer satisfaction we should recognize it as a latent variable, quantified through multiple indicators, and assume there is heterogeneity. Accordingly, we measured customer satisfaction indirectly, as a latent variable in LSM based on data from the survey. In line with Fonseca (2009), heterogeneity in the service sector is expected because different teams provide the same services.

This methodology presents several advantages: a) it accommodates multiple attributes (including mixed case); b) it provides parsimonious models to identify the relationships between these multiple attributes; c) and it reveals latent segments for overall customer satisfaction, based on the indicators of its three dimensions (technical and functional quality and corporate image). The use of LSM has become increasingly popular in marketing literature, for instance Wedel & Kamakura (1998), Dillon & Kumar (1994), and Bhatnagar and Ghose (2004). This approach to segmenting offers additional advantages when compared with other segmenting techniques: a) it identifies segments and provides unbiased segment membership estimates, Dillon & Kumar (1994); b) it provides means to selecting the best number of segments, McLachlan & Peel (2000); c) it is able to deal with different measurement levels, Vermunt and Magidson (2002); d) demographic and other covariates can be used for segment description, Magidson & Vermunt (2003); e) it allocates cases into segments based upon membership probabilities estimated directly from the model, instead of using an ad-hoc definition of ''distance'' (e.g., Euclidian distance), Bonilla & Huntington (2005).

Let $\underline{y}_i = (y_{ip})$ denote the vector representing the scores of the ith case for the pth segmentation base variable ($i = 1, \ldots, n$; $p = 1, \ldots, P$).

We consider that the cases on which the attributes are measured arise from a population which we assume to be a mixture of S segments, in proportions of λ_s (mixing proportions or relative segment sizes), $s = 1, \ldots, S$. The statistical probability density function of the vector $\underline{y}_i$, given that $\underline{y}_i$ comes from segment s, is represented by $f_s(\underline{y}_i \mid \underline{\theta}_s)$, with $\underline{\theta}_s$ representing the vector of unknown parameters associated with the specific chosen probability density function. Consequently, the population density can be represented as a finite mixture of the densities $f_s(\underline{y}_i \mid \underline{\theta}_s)$ of S distinct segments, i.e. (Fonseca, 2013a)

$$f(\underline{y}_i \mid \underline{\psi}) = \sum_{s=1}^{S} \lambda_s \prod_{p=1}^{P} f_s(\underline{y}_i \mid \underline{\theta}_s) \quad (1)$$

where $i = 1, \ldots, n$,

$\lambda_s > 0$, $\sum_{s=1}^{S} \lambda_s = 1$, $\underline{\psi} = \{\underline{\lambda}, \Theta\}$, with $\underline{\lambda} = \{\lambda_1, \ldots \lambda_{s-1}\}$, $\Theta = \{\underline{\theta}_1, \ldots \underline{\theta}_s\}$,

, and $\underline{\psi}$ is the vector of all unknown parameters.

The LSM estimation approach simultaneously addresses the estimation of distributional parameters and classification of cases into segments, yielding mixing probabilities (Fonseca, 2013b). The estimation process is typically directed to maximum likelihood using the *expectation-maximization* (EM) algorithm, McLachlan & Peel (2000), Dempster, Laird & Rubin (1977).

LSM naturally helps constitute a partition by means of assigning each case to the segment with the highest segment membership probability, that is with $Max_{s=1,\ldots,S}\ \hat{\tau}_{is}$, where

$$\hat{\tau}_{is} = \frac{\hat{\lambda}_s^{(k)} f_s(\underline{y}_i \mid \hat{\theta}_s^{(k)})}{\sum_{j=1}^{S} \hat{\lambda}_j^{(k)} f_j(\underline{y}_i \mid \hat{\theta}_j^{(k)})} \quad (2)$$

A goal of traditional LSM estimation is to determine the smallest number of latent segments S that is sufficient to explain the relationships observed among the segmentation base variables. If the baseline model (S = 1) provides a good fit to the data, no LSM is needed since there is no relationship among the variables to be explained; otherwise, a model with S = 2 segments is then fitted to the data. This process continues by fitting successive LSM to the data, each time adding another dimension by increasing the number of segments by 1, until a parsimonious model is found that provides an adequate fit (Fonseca, 2013b).

For a more complete description of the estimation of the latent class models, using the maximum likelihood method, through the EM algorithm, see McLachlan & Peel (2000), Fonseca & Cardoso (2005).

Concerning methodologies for the selection of the appropriate latent class model, we propose the use of the traditional information criteria. Especially,

because all the observed variables have similar scale measurement, and all of them are categorical, we will use the information criterion of AIC_3, which is mostly advised for this situation (Fonseca & Cardoso, 2007).

RESULTS AND DISCUSSION

Our findings provide an overview of the phenomenon of patient satisfaction with the quality of service. Consequently, our research furthers the understanding of the outcomes of the reforms in Portuguese public health system. The LSM estimation through the AIC_3 information criterion results in a two-segment solution, because the AIC_3 values present an elbow for S = 2. The estimates of both probabilities and conditional probabilities displayed in Table 2 allow us to name the two segments as follows: segment 1, with 48% of patients, represents *satisfied patients*, and segment 2, with 52% of patients, comprises *unsatisfied patients*. These results confirm our hypothesis: the majority of Portuguese patients are dissatisfied with the quality of public health service. However, these results are better than those obtained previously, in 2009, by Fonseca (2013b). Two kinds of probabilities are presented in Table 2, as shown by model (1), which are estimated by LSM to characterize the typology of customer satisfaction: the probabilities λ_s (s = 1, ..., S) of belonging to segment s, and the probabilities $f_s(\underline{y}_i \mid \underline{\theta}_s)$ of answering on a variable category, conditional on belonging to segment s.

At this time, we are able to refine our perception of customer satisfaction, considering the variables included in the conceptual model, through the discussion of the typology of customer satisfaction.

Firstly, the model classifies 48% of patients in cluster 1 and 52% of patients in cluster 2. The other probabilities are conditional. For instance, the probability of 0.1192 (in bold, on 7th line of Table 2) is the probability that a patient characterizes Waiting room conditions 1 as *very bad*, given that s(he) belongs to cluster 2. On the same line, 0.0009 is the probability of a patient in segment 1 giving the same answer. Because the probability of characterizing Waiting room conditions 1 as *very bad* is higher when s(he) belongs to cluster 2, this category of *very bad* is a characteristic of segment 2, as displayed in Table 3.

With the last section of Table 2 which presents the covariates, we are able to provide a better comprehension of both segments of patient satisfaction. It shows that cluster 1 are mostly women and patients aged 30 to 46 years. In contrast, cluster 2 is composed predominantly by men and, in terms of age, includes both patients who are the youngest and the elderly.

Table 2 Customers' corporate image, technical quality and functional quality profiles and covariates by model parameters' estimates

Cluster (size)		Segment 1 (48 percent)					Segment 2 (52 percent)				
Variables		Very bad	Bad	Satisfac-tory	Good	Very good	Very bad	Bad	Satisfac-tory	Good	Very good
Corporate image	Secretaryship and support personnel 1	.0006	.0021	.1893	**.6**	**.2079**	**.0593**	**.0369**	**.5701**	.3147	.019
	Secretaryship and support personnel 2	.0016	.0066	.2456	**.5402**	**.206**	**.0779**	**.0701**	**.5632**	.2669	.0219
	Secretaryship and support personnel 3	.0016	.0168	.3443	**.4136**	**.2236**	**.0778**	**.1547**	**.6109**	.1418	.0148
	Organization functioning 1	.0022	.0243	.2183	**.4908**	**.2644**	**.0769**	**.2034**	**.4448**	.243	.0318
	Organization functioning 2	.08	.128	**.3297**	**.3783**	**.084**	**.3781**	**.2433**	.2519	.1163	.0104
	Organization functioning 3	.0047	.0368	.1817	**.5096**	**.2672**	**.0932**	**.2242**	**.3409**	.2942	.0475
Technical quality	Waiting room conditions 1	.0009	.0171	.415	**.4387**	**.1283**	**.1192**	**.2346**	**.5816**	.0628	.0019
	Waiting room conditions 2	.0062	.1081	**.5118**	**.2967**	**.0772**	**.2113**	**.4752**	.2909	.0218	.0007
	Waiting room conditions 3	.0001	.0078	.3454	**.3886**	**.2581**	**.0401**	**.2691**	**.6494**	.04	.0015
	Medical room conditions	.0008	.0246	.4641	**.3567**	**.1539**	**.0792**	**.2833**	**.5859**	.0493	.0023
	Doctor teams 1	.0028	.0243	.2055	**.4679**	**.2995**	**.0961**	**.2034**	**.4246**	.2384	.0376
	Doctor teams 2	.0033	.0272	.2288	**.4853**	**.2553**	**.1154**	**.2189**	**.4285**	.2114	.0259

Cluster (size)		Segment 1 (48 percent)					Segment 2 (52 percent)				
Variables		Very bad	Bad	Satisfac-tory	Good	Very good	Very bad	Bad	Satisfac-tory	Good	Very good
Functional quality	Doctor teams 3	.0005	.009	.1946	**.5175**	**.2784**	**.0997**	**.207**	**.5218**	.1614	.0101
	Nursing 1	.0002	.0123	.2655	**.4677**	**.2543**	**.0398**	**.2421**	**.5926**	.1183	.0073
	Nursing 2	.0001	.0045	.1664	**.5735**	**.2555**	**.0801**	**.1938**	**.5655**	.155	.0055
	Nursing 3	.0001	.0081	.226	**.4836**	**.2822**	**.0601**	**.2687**	**.5735**	.0936	.0042
	Other professionals 1	0	.0016	.2499	**.5674**	**.1811**	**.0402**	**.1783**	**.7372**	.0439	.0004
	Other professionals 2	0	.0005	.175	**.6435**	**.181**	**.1205**	**.0796**	**.7329**	.0665	.0005
	Auxiliary staff	0	.0018	.1095	**.657**	**.2317**	**.0602**	**.2182**	**.5734**	.1459	.0022
Covariates	Age	0–12	13–18	19–29	30–46	47–64	0–12	13–18	19–29	30–46	47–64
		.2173	0	.1774	**.2555**	.1808	**.165**	**.1999**	**.2875**	.1257	**.2219**
	Sex		Female		Male			Female		Male	
			.4513		.5487			.4046		**.5954**	

Table 3 summarizes patients' characteristics concerning both the clustering variables and the covariates used. This profile shows that only 48% of cases are satisfied, against 52 percent of unsatisfied.

Table 3 Customers' typology

Variables	Satisfied (48%) (39 percent)	Unsatisfied (52%) (61 percent)
Secretaryship and support personnel 1	Good; Very good	Very bad; Bad; Satisfactory
Secretaryship and support personnel 2	Good; Very good	Very bad; Bad; Satisfactory
Secretaryship and support personnel 3	Good; Very good	Very bad; Bad; Satisfactory
Organization functioning 1	Good; Very good	Very bad; Bad; Satisfactory
Organization functioning 2	Satisfactory; Good; Very good	Very bad; Bad
Organization functioning 3	Good; Very good	Very bad; Bad; Satisfactory
Waiting room conditions 1	Good; Very good	Very bad; Bad; Satisfactory
Waiting room conditions 2	Satisfactory; Good; Very good	Very bad; Bad
Waiting room conditions 3	Good; Very good	Very bad; Bad; Satisfactory
Medical room conditions	Good; Very good	Very bad; Bad; Satisfactory
Doctor teams 1	Good; Very good	Very bad; Bad; Satisfactory
Doctor teams 2	Good; Very good	Very bad; Bad; Satisfactory
Doctor teams 3	Good; Very good	Very bad; Bad; Satisfactory
Nursing 1	Good; Very good	Very bad; Bad; Satisfactory
Nursing 2	Good; Very good	Very bad; Bad; Satisfactory
Nursing 3	Good; Very good	Very bad; Bad; Satisfactory
Other professionals 1	Good; Very good	Very bad; Bad; Satisfactory
Other professionals 2	Good; Very good	Very bad; Bad; Satisfactory
Auxiliary staff	Good; Very good	Very bad; Bad; Satisfactory
Covariates		
Age	30–46	Younger than 30 and older than 46
Gender	Mostly female	Mostly male

CONCLUSION, IMPLICATIONS AND FUTURE WORK

The objectives of the reform were all well set and were appropriate. However they were implemented under the harsh conditions of the Portuguese bailout crisis, with severe restrictions concerning the hiring of doctors, nurses and support staff. Public administrators/managers would like to have an overall picture of service quality in hospitals, uncovering patterns of patient satisfaction. This information would allow them to influence policy makers in designing future strategies, since extra resources and better management are the most likely sources of service improvement, according to Boyne (2003). When thinking of corporate image, as Smith & Bolton (2002) also stated, it takes more than smiles to amend service failures, and service personnel must have a real ability to improve customers' situations. However, in subjective evaluations of health care quality, when patients they are unsatisfied with corporate image they are also unsatisfied with technical quality and functional quality, in all considered aspects. In order to uncover the pattern of patient satisfaction, we applied latent segment models, and the structure of patient segments is now clear. Moreover, we found a two-segment latent structure: segment 1, the satisfied, with 48 percent of the patients, predominantly women and 30–46 years old, and segment 2, the unsatisfied, with 52 percent of the patients, mostly men and the youngest/elderly patients. These results confirm our hypothesis that the majority of Portuguese patients are dissatisfied with the quality of the public health service. However, the situation is now better than it was in 2012, according to a previous study (Fonseca, 2013a).

Our findings provide a more nuanced and positive assessment than much of the implementation literature. Policy makers will find it necessary to define, monitor, and improve the quality of the services they provide. The fact that patients constitute two different segments, with different characteristics, can be used for policy making, helping managers to develop strategies in order to adopt new policies for better performance and eliminate most reasons of patient dissatisfaction. In the study of Rahmqvist & Bara (2010) the youngest/elderly patients are more satisfied, and the findings regarding the influence of gender on global satisfaction are mostly inconsistent. However, in this research on the quality of services of Portuguese public hospitals, gender differences are accentuated and the youngest/elderly are dissatisfied. In conclusion, we answered *RQ1* by proving that customers' views concerning public health service quality are heterogeneous because two segments of customers were found. We also answered *RQ2* by revealing that 52% of customers are unsatisfied with service quality. As a result, we may conclude that public health service quality in the Portuguese context needs to be improved. Thus,

policymakers' challenge is to develop ways to use the outcomes provided by this research to improve health care in public hospitals across the spectrum of quality.

In future work, we still need to attain a more profound understanding of the nature of the interpersonal exchange between patient and all health care agents, in order to learn how to identify and quantify its attributes, and to determine how these contribute to the patient's health and welfare (Donabedian, 1997).

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