Social Science & Medicine 138 (2015) 1–11

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

Improving health worker performance: The patient-perspective from a PBF program in Rwanda

Laurence Lannes

London School of Economics and Political Science, Houghton Street, London WC2A 2AE, UK

ARTICLE INFO

Article history:
Available online 23 May 2015

Keywords:
Rwanda
Patients' satisfaction
Incentives
Health workforce performance
Low and middle income countries

ABSTRACT

The effect of performance-based financing (PBF) on patients' perception of primary health care services in developing countries in not well documented. Data from a randomized impact evaluation in Rwanda conducted between 2006 and 2008 in 157 primary level facilities is used to explore patients' satisfaction with clinical and non-clinical services and quantify the contribution of individual and facility characteristics to satisfaction including PBF. Improvements in productivity, availability and competences of the health workforce following the implementation of PBF have a positive effect on patients' satisfaction with clinical services even if patients' satisfaction is not tied to a reward. The positive effect of PBF on non-clinical dimensions of satisfaction also suggests that PBF incentivizes providers to raise patients' satisfaction with non-clinical services if it is associated with future financial gains. It is recommended that low and middle income countries build on the experience from high income countries to better listen to patients' voice in general and include an assessment of patients' satisfaction in incentive mechanisms as a way to increase the benefits of the strategy.

1. Introduction

Over recent decades, paying healthcare providers against agreed performance targets has gained momentum in high income countries and more recently in low and middle income countries (LMIC). Financial incentives aim to provide extrinsic motivation so as to improve health workforce performance and contribute to a health system's performance. Poor performance in health systems is a worldwide concern and greater investment in the health sector do not necessarily translate to better health outcomes (World Health Organization, 2000).

Performance incentives are increasingly promoted to enhance health workforce performance. While many terms are being used for performance systems (performance-based incentives, performance-based contracting, results-based financing, Pay-4-Performance) the term Performance-Based Financing (PBF) is adopted in this paper as it is commonly used in LMIC countries. PBF can be defined as "a system approach with an orientation on results defined as quantity and quality of service outputs and inclusion of vulnerable persons (…)" (Cordaid-SINA Health, 2014).

PBF is increasingly adopted in LMIC although the reform approach has been criticized on several fronts. Ireland et al. (2011) highlight the lack of rigorous evidence apart from Rwanda and a bias in publishing only positive results on PBF. They claim that the strategy has important administrative costs and that it can deter equity in access to services. They also argue that PBF may crowd out intrinsic motivation and encourage gaming within the system. Nevertheless the consensus on the positive effect of the strategy is growing as new evidence becomes available. For instance in Burundi, PBF was found to improve the utilization and quality of most maternal and child health services (Bonfrer et al., 2014b). The potential of performance-based financing to address structural problems of health systems is more and more acknowledged. As argued by Meessen et al. (2011), PBF can be a reform catalyst. PBF is now recognized as a holistic reform approach comparable to the old paradigms of primary healthcare and the Bamako initiative. The innovative provider payment mechanism is only one dimension of PBF and that the approach is more comprehensive as it entails, among others, health facility autonomy, integrated management of funds, autonomous human resource management, more efficient management of drugs, better quality standards, strengthened governance and accountability (Fritsche et al., 2014).

As opposed to demand side interventions that incentivize the population to use health care services (such as conditional cash transfers or vouchers), this article focuses on a supply side

E-mail address: l.e.lannes@lse.ac.uk.

http://dx.doi.org/10.1016/j.socscimed.2015.05.033
0277-9536/

mechanism that incentivizes healthcare providers' to achieve quantitative and qualitative targets in the delivery of services. Such mechanisms usually rely on indicators related to providers' practice with the quality of care traditionally being measured from a clinical viewpoint. Patients' view on their interaction with the health system has often been overlooked in the past. Patients' satisfaction is however a desired outcome of care and an indicator of process quality (Donabedian, 1988).

Satisfaction with health services is a multidimensional phenomenon and is categorized in various ways in the literature. Patients' satisfaction results from their perception of service quality including: *interpersonal quality*, which reflects the relationship between the service provider and the patient; *technical quality*, which relates to the outcomes achieved and the technical competence of the service provider; *environment quality*, which corresponds to environmental features that shape consumer service perceptions; and *administrative quality*, which relates to facilitating (non-health related) services for the delivery and consumption of the health service (Dagger et al., 2007). The evidence suggests that patients' satisfaction is predominantly determined by the quality of medical care (including competences, infrastructure, health services, diagnostic and therapeutic procedures); information; equity in access; costs; waiting time; cleanliness; and participative approach of care (Mpinga and Chastonay, 2011).

The patient-oriented perspective of this paper is justified on three grounds. First, one cannot ignore the impact a strategy has on users' satisfaction as it stands for a critical component of service quality evaluation. Second, patients' satisfaction affects compliance with treatment and is therefore important from a public health perspective. Third, satisfied patients will continue using services and recommend services to others. As PBF in LMIC primarily aims to increase utilization of health services, it is critical to ascertain that poor satisfaction with services is not hampering overall utilization. PBF focuses on providers and sets clinical targets: thus, the hypothesis is that PBF will result in improved satisfaction from clinical aspects but will have no effect on satisfaction with non-clinical dimensions. This hypothesis is tested with data from a randomized control trial of the national PBF scheme in Rwanda. In this scheme targeting primary healthcare facilities, incentives were based on the quantity of outputs achieved conditional on the quality of services delivered using 14 maternal and child health output indicators and 13 quality indicators (Basinga et al., 2011). Patients' satisfaction was not measured.

This paper will also aim to verify the reform potential of PBF with a particular focus on patients' satisfaction in quality assurance. The analysis covers satisfaction with prenatal care and with curative care for children and adults. In the subsequent sections, a brief literature review on patients' satisfaction and PBF is presented, followed by methods, results and a discussion with policy recommendations.

2. Background

Performance incentives across the world were designed to address agency issues resulting from the agent (provider) having different goals and motivations than those of the principal (patient or purchaser of health services). Performance incentives aim to align the objectives of the agent with those of the principal by tying the reward to the achievement of the principals' objectives. The downside, if PBF does not include a complete set of outputs to ensure the full health package is delivered, is that providers may focus on rewarded services and overlook other parts of their activity. One direct implication is that providers will have no incentive to raise patients' satisfaction if they are not rewarded for it. However, as unsatisfied patients' may decide not to visit the facility again, providers may perceive the need to satisfy patients, even in the absence of a reward, in particular for dimensions that determine the most satisfaction and that they can influence.

In HIC, patients' satisfaction surveys are regularly used to collect their judgment on the quality of care and P4P schemes include measures of patients' satisfaction (Peterson et al., 2006). This stands for a major difference with traditional LMIC health systems where patients' perception about health services is largely ignored. In LMIC, PBF schemes have tended to adopt a narrow clinical focus with the risk that providers would focus on clinical indicators at the expense of patients' satisfaction. More recent PBF schemes however measure patients' satisfaction (Cordaid-SINA Health, 2014) but the results are not yet reported in the literature. This article thus takes an unusual viewpoint (the patients' one) to assess the effect of PBF on the quality of health services.

In most P4P schemes in HIC, a measure of patients' satisfaction is used, along with process (content of care), outcome (effect of care on patients) and structure measures (facility, personnel, equipment) to calculate the financial incentive (Peterson et al., 2006). The measure generally assesses patients' perception of the quality of care (such as information, cleanliness or privacy) (Rosenthal et al., 2004). However, published studies on the effect of P4P focus on a narrow definition of quality (clinical) and do not present the patients' perspective (Campbell et al., 2007; Peterson et al., 2006; Young et al., 2000).

Evidence from LMIC is scant. In the Democratic Republic of Congo, Soeters et al. (2011) found that patients were more satisfied with the availability of drugs, perceived quality and respect for patients in districts participating in the PBF program. Waiting time was judged more acceptable in control districts, but the difference with PBF districts was not significant. Other evaluations of PBF schemes do not report the impact on patients' satisfaction. Patients' satisfaction in LMIC is studied in relation to the status of health facilities (public or private) with authors arguing that what differs between those facilities is the available financial incentive. In a comparative analysis of patients' satisfaction with family planning services in Tanzania, Kenya and Ghana, Hutchinson et al. (2011) found that patients were more satisfied with the process quality in private facility but found less difference on technical quality. Greater satisfaction with family planning services in private facilities was associated with process and structural factors such as reduced waiting time and less stock outs. A systematic review using 80 studies on LMIC also found that drug supply, waiting time, privacy, confidentiality, staff friendliness, communication, dignity and efforts were better in the private sector but that patient satisfaction with care did not differ between public and private providers (Berendes et al., 2011).

3. Methods

3.1. Study design

The empirical study relies on data from the impact evaluation of the national PBF for primary level facilities in Rwanda. It was the first randomized experiment used to rigorously assess the impact of PBF in Africa. It took advantage of the phased PBF implementation over a 23-month period between 2006 and 2008. The 19 rural districts that did not implement a PBF pilot before 2006 were paired and randomly assigned to treatment (12 districts) or control groups (7 districts). The remaining 11 districts that already piloted PBF were excluded from the impact evaluation. The three urban districts of the country were not included; therefore the study focuses on rural districts only.

3.2. Data

The study relies on secondary data analysis. The author was not involved in data collection but performed all data analysis. The research protocol for this study was approved by the Rwanda National Ethics Committee. Data was collected from 157 primary level facilities, including 77 treatment facilities and 80 control facilities in 2008, after two years of PBF implementation in treatment facilities. Patient exit interviews were conducted with patients visiting the health center on the day of the interview for prenatal care, child curative care and adult curative care. In the case of children, respondents were the accompanying adult. Eight to twelve patients were interviewed for each service in each facility. Information collected from the patients included: patient characteristics, provider effort and patient satisfaction with services. Patients were asked to rank their satisfaction with medical and non-medical services according to five categories: very unsatisfied, unsatisfied, no opinion, satisfied and very satisfied for a list of ten satisfaction indicators.

3.3. Variables

To facilitate the interpretation of results as one could not present analyses for the ten dimensions and some dimensions might measure similar patterns, an index was constructed from the various dimensions of satisfaction as already done elsewhere (Gerber and Prince, 1999; Rao et al., 2006) The traditional principal component analysis (PCA) method that creates indexes from dummy variables (Filmer and Pritchett, 2001) was not appropriate as satisfaction variables are ordinal. Using dummy indicators in PCA would have introduced fake correlations as there were more than two categories for a variable. Following Kolenikov and Angeles (2009), polychoric correlation, an alternative approach for the analysis of ordinal data using PCA, was used. It assumes that ordinal variables were obtained by categorizing normally distributed underlying variables, and that those unobserved variables follow a bivariate normal distribution. Polychoric correlation corresponds to the maximum likelihood estimate of that correlation.

The first factor structure derived from polychoric correlation resulted in only one factor having an Eigenvalue over 1 and explaining 88% of the variation. However, waiting time, time with provider and cleanliness were not well captured by the first factor as their uniqueness exceeded their contribution to factor 1 (Tables 1a and 1b). These variables were thus removed from factor 1 and factor 1 was normalized to facilitate interpretation. As further analysis showed that they could not be combined in an index, they were kept as single measures of satisfaction.

Four satisfaction measures were retained, including one index corresponding to satisfaction with clinical services and three measures of satisfaction corresponding to non-clinical services (Table 1c).

Table 1b
Contribution of variables to factor 1.

Variables	Factor 1	Uniqueness
Waiting time	0.4164	0.8266
Time w/provider	0.5824	0.6608
Cleanliness	0.596	0.6448
Privacy	0.684	0.5321
Staff attitude	0.7362	0.458
Cost of service	0.6606	0.5636
Cost of drug	0.6611	0.5629
Avail. of drugs	0.6659	0.5565
Explanation	0.6855	0.5301
Overall service	0.7888	0.3778

3.4. Statistical methods

Ordinary least squares (OLS) were used for the regression on the clinical satisfaction index for each sample. OLS were compared to a censored model (Tobit) assuming no negative values. Regression outcomes from OLS and Tobit were comparable revealing the robustness of OLS outputs presented in this paper. Independent variables aimed to control for facility characteristics (public or faith-based, PBF treatment or control); individual characteristics (primary education, sex when relevant, age, health insurance); and characteristics of the health service (whether the patient was given a prescription to buy drugs outside or to perform laboratory tests from another health facility). In the sample of pregnant women, controls also included the months of pregnancy and whether it was their first prenatal care visit. In the sample of children, their age was controlled for. For all models, all independent variables were included in the models based on variables' availability and variables that proved to influence satisfaction in the literature. A review of the literature indeed revealed that sicker patients tend to be less satisfied, while older and less educated patients are more satisfied. Evidence on gender, ethnicity and socio-economic status remains unclear (Crow et al., 2002; Hall and Dornan, 1990; Hekkert et al., 2009; Sitzia and Wood, 1997).

The ordinal measures of satisfaction with non-clinical services (waiting time, time with provider and cleanliness) were modeled with ordered probit regressions. Independent variables included facility characteristics (public of faith-based, PBF treatment or control) and individual characteristics (primary education, sex, age and health insurance). Time spent waiting in the facility was added as a control in the regression on satisfaction with waiting time. As only the sign of coefficients of ordered probit regressions can be interpreted, marginal effects were computed. They measure the impact of change in an independent variable on the expected change in the dependent variable.

3.5. Robustness checks

Data drawn from the household surveys, which provide

Table 1a
Output of initial factor analysis.

Factor	Eigenvalue	Diff.	Prop.(% of variation explained)	Cum.(cumulative variation explained)
1	4.28670	3.52473	0.8823	0.882
2	0.76197	0.53421	0.1568	1.039
3	0.22776	0.08069	0.0469	1.086
4	0.14707	0.0455	0.0303	1.116
5	0.10157	0.13436	0.0209	1.137
6	−0.03279	0.03236	−0.0067	1.130
7	−0.06515	0.08863	−0.0134	1.117
8	−0.15378	0.04091	−0.0317	1.085
9	−0.19469	0.02532	−0.0401	1.045
10	−0.22001	0	−0.0453	1

Table 1c
Satisfaction measures retained for analysis.

Area	Satisfaction measure	Satisfaction indicators included in the measure
Clinical services	Clinical services index	Privacy during examination, staff attitude, explanation, cost of drugs, cost of the service, availability of drugs, overall satisfaction
Non-clinical services	Waiting time	Waiting time
	Time with provider	Time with provider
	Cleanliness	Cleanliness

information on the utilization of health services collected from 2145 households in the catchment areas of the 157 primary level facilities of the impact evaluation, was used to control for district level utilization of child curative care and prenatal care services. Following evidence of large regional disparities in utilization of basic health services in Rwanda, robustness checks verify whether the observed effect of PBF on satisfaction varies with a district level utilization of services.

4. Results

4.1. Descriptive analysis

The majority of respondents were satisfied with prenatal care and curative care for children and adults. Overall satisfaction (respondent satisfied or very satisfied) with service reached 86% for adult curative care, 90% for child curative care and 95% for prenatal care. Satisfaction with the cost of drugs and services, which occurs in about 90% of cases, is probably due to the fact that most patients benefit from health insurance. Drugs delivered at the facility and medical services are thus free of charge, except for a small financial contribution. Dissatisfaction with waiting time is the largest of the three categories of care as close to half of respondents were not satisfied (Figs. 1–3). On average, patients waited for two and half hours before seeing a healthcare provider and 20%–25% had to wait for more than 3 h (and some up to 8 h). Descriptive statistics of independent variables included in the models are presented in Annex 1. T-tests reveal overall balance between the treatment and control groups.

4.2. Regression analyses

4.2.1. Adult curative care

Adults seeking care from a facility implementing PBF are more satisfied with clinical services (+2.5%), time spent with provider and cleanliness of the facility compared to patients in control facilities. PBF has no effect on satisfaction with waiting time. Health insurance is the only other determinant of satisfaction with clinical

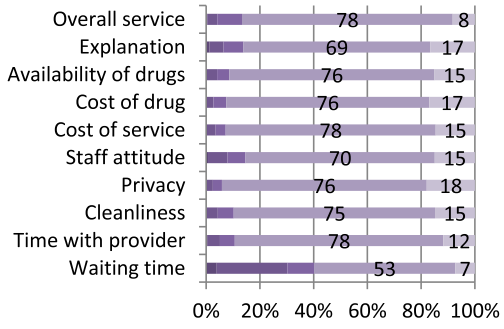

Fig. 1. Satisfaction with curative care for adults.

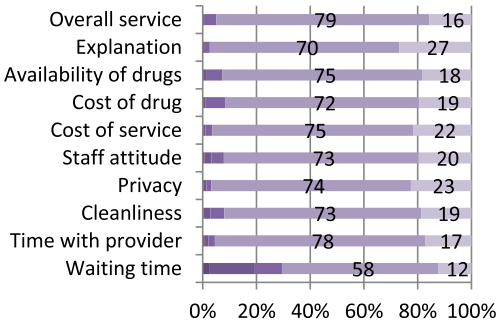

Fig. 2. Satisfaction with prenatal care.

services: insured patients were 6.7% more satisfied with clinical services than non-insured ones. This may reflect that patients' that are more satisfied with services of the health facility are those with health insurance. Patients' characteristics such as age, education or sex have no effect. Similarly, prescribing practices (for drugs or laboratory tests) did not influence adults' satisfaction with clinical services (Table 2a).

Marginal effects computed in Table 2b shows that men were 7% more likely to be unsatisfied or very unsatisfied with waiting time compared to women. A possible explanation could be that the opportunity cost of waiting is higher for men. Adults were also 7% less likely to be satisfied with an additional waiting hour and 3% less likely to be very satisfied. Age is positively associated with satisfaction with waiting time as older patients tend to be more satisfied. PBF has no effect on satisfaction with waiting time but a positive effect on satisfaction with time spent with provider as patients were 2% more likely to be very satisfied in treatment facilities. Patients in PBF facilities were also 4% more likely to be very satisfied with cleanliness. Contrary to waiting time, patients' characteristics did not influence satisfaction with time spent with the provider and the cleanliness of the facility (Table 2b).

4.2.2. Prenatal care

Results on satisfaction with prenatal care present some differences when compared to satisfaction levels with curative care for adults. As for adults, pregnant women seeking care from PBF facilities were more likely to be satisfied with clinical services (+1%). However, PBF also positively influenced satisfaction with waiting time which was not the case for adults. Finally, PBF showed no effect on satisfaction with time spent with provider and cleanliness. Satisfaction with clinical services decreased in public facilities but increased when women were asked to perform laboratory tests from another facility (+1%). Satisfaction with care also slightly rose

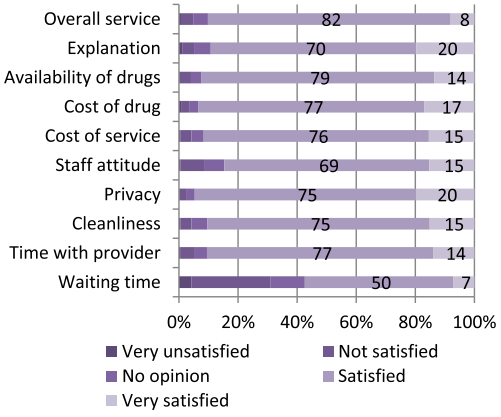

Fig. 3. Satisfaction with curative care for children.

Table 2a
Satisfaction with clinical and non-clinical services for adult curative care.

Variables	Clinical services index	Waiting time	Time with provider	Cleanliness
	OLS	OP	OP	OP
Public (=1)	−0.014	−0.025	0.002	−0.170**
	(0.009)	(0.064)	(0.071)	(0.070)
PBF (=1)	0.025***	−0.016	0.119*	0.169**
	(0.008)	(0.061)	(0.068)	(0.067)
Drug prescription (=1)	−0.003			
	(0.008)			
Laboratory tests (=1)	0.024			
	(0.030)			
Has primary education (=1)	0.013	0.044	0.005	−0.013
	(0.008)	(0.065)	(0.072)	(0.072)
Male (=1)	−0.006	−0.180***	0.052	−0.033
	(0.008)	(0.063)	(0.070)	(0.069)
Age	0.000	0.006***	0.002	0.003
	(0.000)	(0.002)	(0.002)	(0.002)
Has health insurance (=1)	0.067***	0.012	0.130	0.304*
	(0.025)	(0.164)	(0.180)	(0.177)
Waiting time (hours)		−0.257***		
		(0.020)		
Observations	1088	1324	1326	1314

Note: Standard errors in parentheses; ***p < 0.01, **p < 0.05, *p < 0.1.
OLS = Ordinary Least Squares; OP = Ordered Probit.

with months of pregnancy (Table 2c).

Marginal effects associated with the three non-clinical dimensions of satisfaction showed that women were 3% more likely to be satisfied and 4% more likely to be very satisfied with waiting time in PBF facilities compared to the control group. Satisfaction with waiting time decreased by 4% among more educated women and with time spent waiting (−6% per hour) but this improved with months of pregnancy. Satisfaction with time spent with providers decreases with primary education (Table 2d).

Satisfaction with waiting time, time with provider and cleanliness of the facility was consistently greater in faith-based facilities compared to public facilities, with the probability of women being very satisfied increasing from 3% to 6% in faith-based facilities (Table 2d). As for adults, most individual characteristics did not influence satisfaction with time spent with provider and cleanliness of the facility.

4.2.3. Child curative care

PBF showed to have the smallest effect on child curative care, as the strategy only influenced satisfaction with clinical services with respondents (accompanying adult) being 2% more satisfied in treatment facilities. PBF had no effect on satisfaction with waiting time, time with provider or cleanliness. As for adult curative care, satisfaction with clinical services improved by 5% among insured respondents and no other individual or service-related factor influenced satisfaction with clinical services (Table 2e).

As for other groups of patients, waiting time was the satisfaction dimension most influenced by individual characteristics. Insured respondents and those with primary education were less likely to be satisfied or very satisfied with waiting time. Their satisfaction

Table 2b
Satisfaction with non-clinical services related to adult curative care (marginal effects).

	Very unsatisfied		Unsatisfied		No opinion		Satisfied		Very satisfied	
	Marginal effect	SE	Marginal effect	SE	Marginal effect	SE	Marginal effect	SE	Marginal effect	SE
Waiting time										
Public = 1	0.002	0.004	0.007	0.018	0.001	0.003	−0.007	0.017	−0.003	0.008
PBF = 1	0.001	0.004	0.004	0.017	0.001	0.003	−0.004	0.016	−0.002	0.007
Primary education = 1	−0.003	0.004	−0.012	0.018	−0.002	0.003	0.012	0.017	0.005	0.008
Male = 1	0.012***	0.004	0.051***	0.018	0.007***	0.003	−0.049***	0.018	−0.020***	0.007
Age	−0.000***	0.000	−0.002***	0.001	−0.000***	0.000	0.002***	0.001	0.001***	0.000
Health insurance = 1	−0.001	0.010	−0.003	0.046	−0.001	0.007	0.003	0.045	0.001	0.019
Waiting time (hours)	0.016***	0.002	0.072***	0.006	0.011***	0.002	−0.069***	0.007	−0.030***	0.003
Time with provider										
Public = 1	−0.000	0.001	−0.000	0.006	−0.000	0.006	−0.000	0.001	0.000	0.014
PBF = 1	−0.002	0.001	−0.010*	0.006	−0.009*	0.005	−0.002	0.002	0.023*	0.013
Primary education = 1	−0.000	0.001	−0.000	0.006	−0.000	0.006	−0.000	0.001	0.001	0.014
Male = 1	−0.001	0.001	−0.005	0.006	−0.004	0.005	−0.001	0.002	0.010	0.014
Age	−0.000	0.000	−0.000	0.000	−0.000	0.000	−0.000	0.000	0.000	0.000
Health insurance = 1	−0.003	0.004	−0.012	0.019	−0.011	0.015	0.002	0.008	0.024	0.030
Cleanliness										
Public = 1	0.001*	0.001	0.013**	0.005	0.014**	0.006	0.011*	0.006	−0.040**	0.017
PBF = 1	−0.001	0.001	−0.014**	0.006	−0.015**	0.006	−0.009**	0.004	0.039**	0.015
Primary education = 1	0.000	0.001	0.001	0.006	0.001	0.006	0.001	0.004	−0.003	0.016
Male = 1	0.000	0.001	0.003	0.006	0.003	0.006	0.002	0.003	−0.007	0.016
Age	−0.000	0.000	−0.000	0.000	−0.000	0.000	−0.000	0.000	0.001	0.000
Health insurance = 1	−0.004	0.004	−0.031	0.022	−0.029	0.018	0.004	0.015	0.059**	0.029

Note: ***p < 0.01, **p < 0.05, *p < 0.1.

Table 2c
Satisfaction with clinical and non-clinical services for prenatal care.

	Clinical services index	Waiting time	Time with provider	Cleanliness
	OLS	OP	OP	OP
Public (=1)	−0.004*	−0.153**	−0.170**	−0.210***
	(0.002)	(0.068)	(0.080)	(0.075)
PBF (=1)	0.006**	0.199***	−0.029	0.089
	(0.003)	(0.064)	(0.074)	(0.070)
Drug prescription (=1)	−0.001			
	(0.002)			
Laboratory tests (=1)	0.011**			
	(0.005)			
Has primary education (=1)	−0.004	−0.128**	−0.174**	−0.104
	(0.003)	(0.065)	(0.076)	(0.071)
Age	0.000	0.005	−0.012	0.006
	(0.000)	(0.008)	(0.009)	(0.008)
Has health insurance (=1)	0.002	−0.041	0.180	−0.034
	(0.002)	(0.121)	(0.141)	(0.134)
Waiting time (hours)	0.000	−0.174***		
	(0.000)	(0.018)		
Months pregnant	0.001***	0.052***	0.019	0.023
	(0.000)	(0.019)	(0.022)	(0.021)
First prenatal visit (=1)	0.006			
	(0.004)			
Number of children		−0.032	0.005	−0.032
		(0.028)	(0.033)	(0.031)
Observations	683	1197	1196	1192

Note: Standard errors in parentheses; ***p < 0.01, **p < 0.05, *p < 0.1.
OLS = Ordinary Least Squares; OP = Ordered Probit.

also decreased as they spent more time waiting. Satisfaction with time spent with the provider was higher for younger children. Finally, patients were 4.5% more likely to be very satisfied with cleanliness in faith-based facilities (Table 2f).

4.3. Robustness check

Robustness checks were run to see whether satisfaction with clinical services (index) was influenced by regional disparities in the utilization of health services. Utilization of four or more prenatal care visits and of curative care for children in the event of an illness was aggregated at the district level to create two groups of districts (lower and upper) according to their utilization level. This grouping revealed that the overall coverage of four or more antenatal care visits was larger than that of curative care for children in the event of an illness. Higher utilization of services was observed in almost the same districts for both services (Southern and Northern part of the country) and Eastern districts consistently registered with lower utilization rates (Figs. 4 and 5).

The robustness checks confirm the positive effect of PBF on patients' satisfaction with clinical services among pregnant women and children under five. They reveal however that PBF has an effect

Table 2d
Satisfaction with non-clinical services related to prenatal care (marginal effects).

	Very unsatisfied		Unsatisfied		No opinion		Satisfied		Very satisfied	
	Marginal effect	SE	Marginal effect	SE	Marginal effect	SE	Marginal effect	SE	Marginal effect	SE
Waiting time										
Public = 1	0.007**	0.003	0.032**	0.014	0.012**	0.006	−0.021**	0.009	−0.031**	0.014
PBF = 1	−0.010***	0.004	−0.043***	0.014	−0.016***	0.005	0.030***	0.010	0.038***	0.012
Primary education = 1	0.006*	0.003	0.027*	0.014	0.010*	0.005	−0.020*	0.010	−0.024**	0.012
Age	−0.000	0.000	−0.001	0.002	−0.000	0.001	0.001	0.001	0.001	0.001
Health insurance = 1	0.002	0.006	0.009	0.025	0.003	0.010	−0.006	0.016	−0.008	0.024
Waiting time (hours)	0.009***	0.002	0.037***	0.004	0.014***	0.002	−0.026***	0.004	−0.034***	0.004
Months pregnant	−0.003***	0.001	−0.011***	0.004	−0.004***	0.002	0.008***	0.003	0.010***	0.004
Number of children	0.002	0.001	0.007	0.006	0.003	0.002	−0.005	0.004	−0.006	0.005
Time with provider										
Public = 1	0.003*	0.002	0.004**	0.002	0.008**	0.004	0.029**	0.015	−0.044**	0.021
PBF = 1	0.001	0.001	0.001	0.002	0.001	0.004	0.005	0.012	−0.007	0.019
Primary education = 1	0.003*	0.002	0.005**	0.002	0.008**	0.004	0.027**	0.012	−0.043**	0.019
Age	0.000	0.000	0.000	0.000	0.001	0.000	0.002	0.001	−0.003	0.002
Health insurance = 1	−0.004	0.004	−0.006	0.005	−0.009	0.008	−0.023*	0.014	0.042	0.031
Months pregnant	−0.000	0.000	−0.001	0.001	−0.001	0.001	−0.003	0.004	0.005	0.006
Number of children	−0.000	0.001	−0.000	0.001	−0.000	0.002	−0.001	0.005	0.001	0.008
Cleanliness										
Public = 1	0.002*	0.001	0.011***	0.004	0.016***	0.006	0.030**	0.012	−0.059***	0.022
PBF = 1	−0.001	0.001	−0.005	0.004	−0.007	0.006	−0.011	0.009	0.024	0.019
Primary education = 1	0.001	0.001	0.006	0.004	0.008	0.006	0.013	0.009	−0.028	0.019
Age	−0.000	0.000	−0.000	0.000	−0.001	0.001	−0.001	0.001	0.002	0.002
Health insurance = 1	0.000	0.001	0.002	0.007	0.003	0.010	0.005	0.019	−0.009	0.038
Months pregnant	−0.000	0.000	−0.001	0.001	−0.002	0.002	−0.003	0.003	0.006	0.006
Number of children	0.000	0.000	0.002	0.002	0.003	0.002	0.004	0.004	−0.009	0.008

Note: ***p < 0.01, **p < 0.05, *p < 0.1.

Table 2e
Satisfaction with clinical and non-clinical services for child curative care.

Variables	Clinical services index	Waiting time	Time with provider	Cleanliness
	OLS	OP	OP	OP
Public (=1)	−0.005	0.043	−0.084	−0.189**
	(0.010)	(0.075)	(0.085)	(0.084)
PBF (=1)	0.020**	−0.007	−0.027	0.099
	(0.010)	(0.072)	(0.080)	(0.080)
Drug prescription (=1)	0.001			
	(0.010)			
Laboratory tests (=1)	0.030			
	(0.030)			
Has primary education (=1)	−0.007	−0.172**	−0.018	−0.040
	(0.010)	(0.072)	(0.081)	(0.080)
Male (=1)	−0.005	0.000	0.039	0.001
	(0.013)	(0.126)	(0.141)	(0.140)
Age	0.001	0.003	0.007	−0.002
	(0.001)	(0.005)	(0.005)	(0.005)
Has health insurance (=1)	0.053**	−0.291**	0.195	−0.052
	(0.024)	(0.125)	(0.140)	(0.139)
Age of the child	−0.006	−0.052*	−0.122***	−0.038
	(0.004)	(0.028)	(0.032)	(0.031)
Waiting time (hours)		−0.206***		
		(0.021)		
Observations	750	947	945	940

Note: Standard errors in parentheses; ***p < 0.01, **p < 0.05, *p < 0.1.
OLS = Ordinary Least Squares; OP = Ordered Probit.

on satisfaction of pregnant women only in districts where utilization of prenatal care is the lowest (+0.5%) and an effect on satisfaction with child curative care in places where utilization is the highest (+3%) (Table 2g).

4.4. Limitations

This paper has its own limitations, although it is one of the first papers to explore the effect of performance incentives on patients' satisfaction in MLIC. As the instructions given to the survey firm on the number of patients to interview in each facility were misunderstood in 2006, too few interviews were conducted on satisfaction at baseline. Thus, only 2008 (follow-up) data is used in the analysis which does not allow isolating the impact of PBF through difference-in-difference technique. Only causal relationships can be drawn. Nevertheless, the analysis benefits from the randomized design of the study and rigorous evaluation of households' perception of the quality of care in their health facility, measured from the household surveys, showed balance at baseline between treatment and control groups (Basinga, 2009). One can reasonably assume that satisfaction of patients exiting the same facilities was also comparable at baseline and that any difference observed at follow-up can be attributed to PBF.

Table 2f
Satisfaction with non-clinical services related to child curative care (marginal effects).

	Very unsatisfied		Unsatisfied		No opinion		Satisfied		Very satisfied	
	Marginal effect	SE	Marginal effect	SE	Marginal effect	SE	Marginal effect	SE	Marginal effect	SE
Waiting time										
Public = 1	−0.003	0.005	−0.012	0.021	−0.002	0.003	0.012	0.021	0.005	0.009
PBF = 1	0.000	0.005	0.002	0.020	0.000	0.003	−0.002	0.020	−0.001	0.008
Primary education = 1	0.012**	0.006	0.048**	0.020	0.007**	0.003	−0.048**	0.020	−0.020**	0.008
Male = 1	−0.000	0.009	−0.000	0.035	−0.000	0.006	0.000	0.035	0.000	0.015
Age	−0.000	0.000	−0.001	0.001	−0.000	0.000	0.001	0.001	0.000	0.001
Health insurance = 1	0.016***	0.006	0.078**	0.032	0.016*	0.008	−0.069***	0.025	−0.041*	0.021
Age of the child	0.004*	0.002	0.014*	0.008	0.002*	0.001	−0.014*	0.008	−0.006*	0.003
Waiting time (hours)	0.014***	0.002	0.057***	0.007	0.009***	0.002	−0.056***	0.007	−0.024***	0.003
Time with provider										
Public = 1	0.001	0.001	0.008	0.007	0.005	0.005	0.005	0.006	−0.019	0.019
PBF = 1	0.000	0.001	0.002	0.007	0.002	0.005	0.001	0.004	−0.006	0.017
Primary education = 1	0.000	0.001	0.002	0.007	0.001	0.005	0.001	0.004	−0.004	0.018
Male = 1	−0.000	0.002	−0.003	0.012	−0.002	0.009	−0.002	0.009	0.009	0.032
Age	−0.000	0.000	−0.001	0.000	−0.000	0.000	−0.000	0.000	0.001	0.001
Health insurance = 1	−0.003	0.003	−0.020	0.016	−0.013	0.010	−0.003	0.005	0.039	0.025
Age of the child	0.001*	0.001	0.011***	0.003	0.008***	0.002	0.006**	0.003	−0.027***	0.007
Cleanliness										
Public = 1	0.003*	0.001	0.013**	0.006	0.015**	0.007	0.015*	0.008	−0.045**	0.021
PBF = 1	−0.001	0.001	−0.007	0.006	−0.008	0.007	−0.006	0.006	0.023	0.019
Primary education = 1	0.001	0.001	0.003	0.006	0.003	0.007	0.002	0.005	−0.009	0.018
Male = 1	−0.000	0.002	−0.000	0.010	−0.000	0.011	−0.000	0.009	0.000	0.032
Age	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	−0.000	0.001
Health insurance = 1	0.001	0.002	0.004	0.009	0.004	0.011	0.004	0.011	−0.012	0.033
Age of the child	0.001	0.000	0.003	0.002	0.003	0.003	0.002	0.002	−0.009	0.007

Note: ***p < 0.01, **p < 0.05, *p < 0.1.

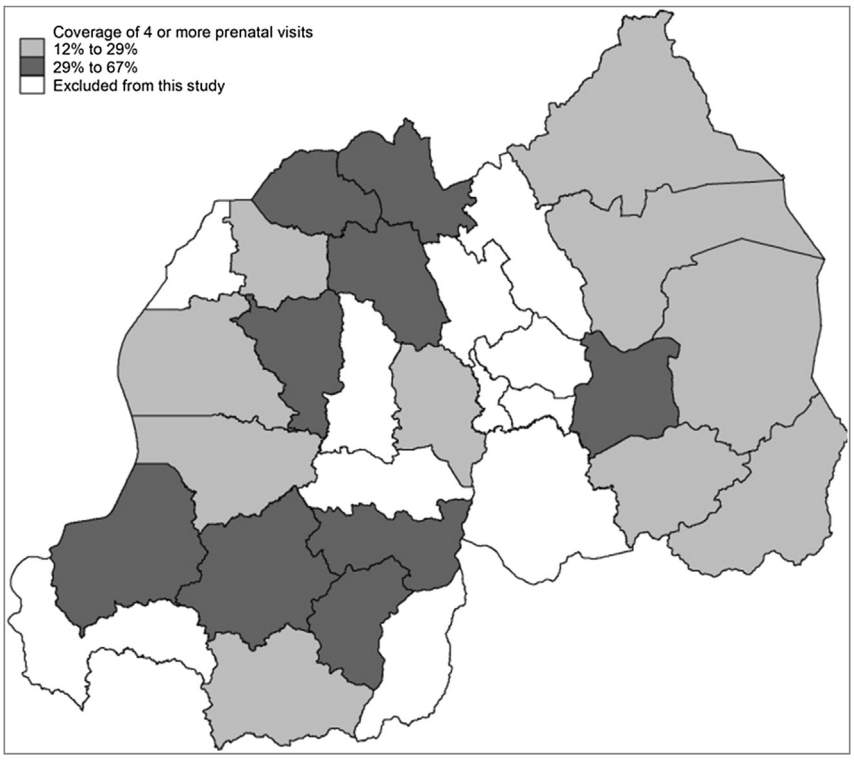

Fig. 4. Coverage of 4 or more prenatal care visits (2 groups).

5. Discussion

This paper adds to knowledge in at least three ways: first, it provides evidence on patients' satisfaction with health services in rural Rwanda. Second, it provides evidence on determinants of patient satisfaction and discusses differences between HIC and LMIC that can serve as policy recommendations. Third, it confirms the PBF reform potential related to quality assurance and patients satisfaction.

As observed in other countries (Bernhart et al., 1999; Sitzia and Wood, 1997), patients interviewed in Rwanda reported high

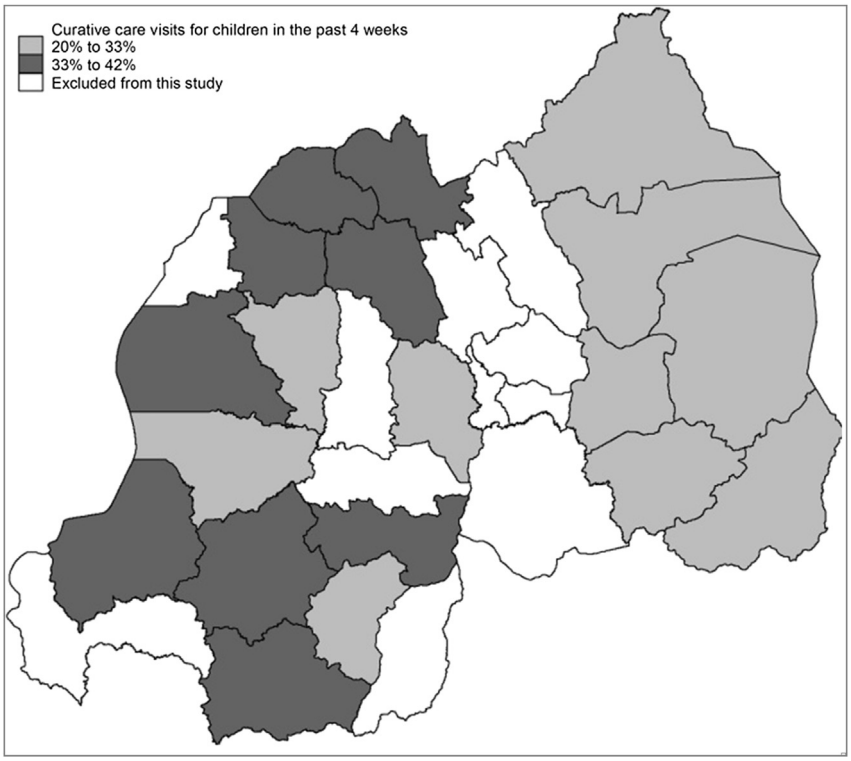

Fig. 5. Curative care for children in the event of an illness (2 groups).

Table 2g
Robustness check for prenatal care and child curative care distinguishing district level utilization.

	Clinical services index for prenatal care		Clinical services index for child curative care	
	Lower group	Upper group	Lower group	Upper group
Public (=1)	−0.004***	−0.006	0.003	−0.001
	(0.001)	(0.008)	(0.016)	(0.014)
PBF (=1)	0.004***	0.007	0.009	0.026*
	(0.001)	(0.007)	(0.015)	(0.014)
Drug prescription (=1)	−0.001	−0.005	−0.015	0.022*
	(0.002)	(0.004)	(0.014)	(0.013)
Laboratory tests (=1)	0.007	0.014**	0.059	−0.002
	(0.005)	(0.007)	(0.039)	(0.027)
Has primary education (=1)	−0.001	−0.009	−0.016	0.008
	(0.001)	(0.009)	(0.014)	(0.014)
Male (=1)			−0.000	−0.020
			(0.018)	(0.019)
Age	−0.000	0.001	0.001	0.000
	(0.000)	(0.001)	(0.001)	(0.001)
Has health insurance (=1)	0.001	0.003	0.047	0.070***
	(0.002)	(0.004)	(0.037)	(0.023)
Waiting time (hours)	0.000	−0.000		
	(0.000)	(0.001)		
Months pregnant	0.001***	0.000		
	(0.000)	(0.000)		
First prenatal visit (=1)	0.004***	0.008		
	(0.001)	(0.009)		
Age of the child			−0.004	−0.008
			(0.006)	(0.005)
Observations	386	297	452	298

Note: Standard errors in parentheses; ***p < 0.01, **p < 0.05, *p < 0.1.

satisfaction levels for clinical and non-clinical services. This contrasts with the suboptimal use of basic health services in the country and suggests a response bias as patients tend to hold back negative views. Respondents show their lack of satisfaction only in the case of waiting time probably because it is the most tangible measure and can be easily quantified. PBF has a positive effect on satisfaction with clinical services, as observed in the Democratic Republic of Congo (Soeters et al., 2011), but its effect on non-clinical services varies. This contrasts with Burundi where Bonfrer et al. (2014a) were not able to find an effect of PBF on the quality of care as reported by patients although clinical quality significantly improved. Results from Rwanda suggest two interesting patterns: first, PBF primarily influences satisfaction related to the clinical content of care: satisfaction with clinical services improved by 2.5% for adult care, 1% for prenatal care and 2% for child care in PBF facilities suggesting that productivity gains achieved through PBF did not hamper healthcare service quality as perceived by patients. This is a key finding as service quality under pay-for-performance schemes is a major concern in the literature (Greene and Nash, 2009; Peterson et al., 2006). Second, PBF can influence non-clinical dimensions of satisfaction if health care providers find an incentive to do so, that is to say if the dimension is somehow compatible with the existing incentives. For instance, with PBF, the proportion of very satisfied adults increases by 2% for time spent with provider and by 4% for cleanliness of the facility whereas those dimensions are not influenced by PBF for pregnant women and children. This may reveal that contrary to pregnant women who primarily pay attention to clinical services as they have no alternative but to visit the health facility, adults that are not satisfied with non-clinical services could have chosen self-medication and thus not visited the facility. As a consequence, health care providers have an incentive to satisfy adults with clinical but also non-clinical dimensions so that they visit the facility again and advise other people to do so, which will have a positive effect of providers' earnings. Interestingly, PBF has no effect on waiting time except for pregnant women: pregnant women are 7% more likely to be satisfied or very satisfied with waiting time in PBF facilities. This suggests that healthcare providers have adopted a coping strategy to raise satisfaction among patients that represent the largest potential financial gain. If pregnant women are very pleased, they may visit the facility again for prenatal care (rewarded service) and institutional delivery (the service with the largest financial reward). This contradicts evidence from the Democratic Republic of Congo where PBF had a negative (but not significant) effect on waiting time (Soeters et al., 2011). In the case of adults and children, dissatisfaction with waiting time can reflect the lack of human resources, space and equipment, but also poor responsiveness of healthcare providers which do not have an incentive to reduce waiting times.

Satisfaction with clinical services is greater among insured patients (+7% for adults and +5% for children). Prescribing laboratory tests also influences a pregnant woman's satisfaction as she may feel that the provider is taking good care of her. Interestingly, individual characteristics do not influence patients' satisfaction with clinical services but only satisfaction with non-clinical services. The study finds that women, older patients and less educated patients tend to be more satisfied with non-clinical services in Rwanda, which is in accordance with published evidence on the determinants of patients' satisfaction (Crow et al., 2002; Hall and Dornan, 1990; Hekkert et al., 2009; Sitzia and Wood, 1997). The results also confirm evidence on satisfaction according to the status of facilities (public or private) in LMIC (Berendes et al., 2011) as differences between public and faith-based facilities were found only for non-clinical services.

Contrary to HIC, the assessment of patients' satisfaction is not systematic in LMIC and only limited evidence exists. Further, LMIC traditional health systems are not well organized to internalize patient satisfaction. Until recently, performance-based financing schemes did not include a measure of satisfaction. As satisfaction with health services determines future utilization, attention paid to patients' satisfaction is however critical to raise the overall utilization of basic health services in LMIC. While HIC intend to limit the number of contacts between patients and the healthcare system, some basic maternal and child health services remain underutilized in LMIC, particularly by the most vulnerable. Low utilization is a

major impediment to patients' becoming a countervailing force because the most unsatisfied patients rarely or never use the services. Results from the robustness check suggest that PBF improves satisfaction with clinical services only from a certain threshold and up to a certain level. For child curative care, where the utilization of services does not exceed one third of cases, PBF could make a difference, but only in districts where utilization is higher. For prenatal care services which are more commonly used, PBF can influence satisfaction, but only in districts with lower utilization. Contrary to high income countries where patients represent a countervailing force and can influence healthcare providers' attitudes, patients from LMIC are not empowered to oppose to healthcare providers.

Three policy recommendations can be drawn from the above analysis. First, health care managers and decision makers in LMIC should consider service quality and patients' satisfaction as important strategic objectives. Measurement of patients' satisfaction should be conducted alongside the traditional monitoring of quality of care to give more weight to patients' voice and incentivize providers to be more responsive. Patients' satisfaction with healthcare services is particularly critical in LMIC where the population lacks trust in health services and where utilization of basic health services is low. Second, designers of PBF schemes in LMIC should integrate satisfaction measures in the incentive mechanism. LMIC should build on the experience from HIC to ensure satisfaction is a component of the quality of care evaluation in general and of performance incentives in particular. In Rwanda for instance, PBF was accompanied by strong reporting and supervision mechanisms (Basinga et al., 2011) that probably contributed to the positive effect of PBF on patients' satisfaction with clinical services. Third, the potential of performance-based financing in addressing structural problems of health systems should be acknowledged. As argued by Meessen et al. (2011), PBF can be a reform catalyst. The Rwanda case shows that although PBF focuses on suppliers of health care services and on the process of care, it can improve patients' experience with health care services and improve their satisfaction with clinical and some non-clinical services. This should further encourage policy makers to explore synergies between PBF and other strategies aimed at improving fuller utilization and higher quality of health services.

6. Conclusion

This study provides evidence on patients' satisfaction with primary health care services in LMIC. It contributes in filling a knowledge gap by looking at an unexplored aspect of performance-based financing, taking a patient's perspective to see how PBF affects healthcare services.

This paper supports the hypothesis that PBF succeeds in improving patients' satisfaction levels with health services, in particular for clinical related services. Improvements in staff availability, productivity and competences can result in patients being more satisfied with both clinical and non-clinical services provided. In other words, efficiency gains are not achieved at the expense of a perceived quality of care. In some instances, PBF can also improve satisfaction with non-clinical dimensions if they can generate future financial gains.

The positive effect of PBF on patient satisfaction confirms that PBF is more than a provider payment mechanism because it can contribute in strengthening health systems. As satisfaction with services can improve healthcare utilization and health outcomes, LMIC should build on the experience of high income countries' to respond better to the voice of patients' and include their feedback in quality assessments. As PBF is increasingly implemented in African countries, its reform catalyst potential should further be explored.

Acknowledgments

The author is grateful to Joan Costa-Font for his comments on this article.

Annex 1

	Control group			Treatment group			Total			T-test of difference in means
	Obs.	Mean	SE	Obs.	Mean	SE	Obs.	Mean	SE	
Adult care										
Public	675	63%	0.018	664	66%	0.018	1339	65%	0.010	0.227
Prescription	675	50%	0.019	664	54%	0.019	1339	52%	0.013	0.143
Laboratory test	675	4%	0.007	664	5%	0.008	1339	4%	0.005	0.553
Has primary education	675	39%	0.018	664	35%	0.018	1339	37%	0.013	0.158
Male	675	40%	0.018	664	37%	0.018	1339	38%	0.013	0.035
Age	675	39	0.609	664	39	0.622	1339	39	0.435	0.935
Has health insurance	675	95%	0.008	664	97%	0.005	1339	96%	0.005	0.007
Prenatal care										
Public	666	64%	0.018	693	68%	0.017	1359	66%	0.013	0.107
Drug prescription	666	6%	0.009	693	5%	0.008	1359	5%	0.006	0.594
Laboratory tests	666	1%	0.004	693	2%	0.005	1359	1%	0.003	0.121
Has primary education	666	43%	0.019	693	40%	0.018	1359	41%	0.013	0.222
Age	666	28	0.248	693	28	0.231	1359	28	0.169	0.525
Has health insurance	666	91%	0.010	693	93%	0.009	1359	92%	0.007	0.304
Waiting time (hours)	666	2.25	0.065	693	2.43	0.072	1359	2.34	0.049	0.066
Months pregnant	666	6.04	0.659	693	5.88	0.069	1359	5.96	0.047	0.111
First prenatal visit	666	67%	0.018	693	67%	0.018	1359	67%	0.013	0.868
Number of children	666	2	0.070	693	2	0.067	1359	2	0.048	0.568
Child care										
Public	505	63%	0.021	459	69%	0.020	964	66%	0.010	0.046
Drug prescription	505	39%	0.021	459	52%	0.023	964	45%	0.016	0.000
Laboratory tests	505	3%	0.007	459	7%	0.012	964	5%	0.006	0.001
Has primary education	505	44%	0.022	459	44%	0.023	964	44%	0.160	0.957
Male	505	9%	0.125	459	10%	0.014	964	10%	0.009	0.418
Age of respondent	505	30.2	0.334	459	30.1	0.385	964	30.1	0.253	0.842
Has health insurance	505	88%	0.014	459	91%	0.013	964	90%	0.009	0.102
Age of the child	505	2	0.060	459	2	0.057	964	2	0.042	0.769

References

Basinga, P., 2009. Impact of Performance-based Financing on the Quantity and Quality of Maternal Health Services in Rwanda (Doctor of Philosophy). School of Public Health and Tropical Medicine of Tulane University, New Orleans.

Basinga, P., Gertler, P., Binagwaho, A., Soucat, A., Sturdy, J., Vermeersch, C., 2011. Effect on maternal and child health services in Rwanda of payment to primary health-care providers for performance: an impact evaluation. Lancet 2011 (377), 1421–1428.

Berendes, S., Heywood, P., Oliver, S., Garner, P., 2011. Quality of private and public ambulatory health care in low and middle income countries: systematic review of comparative studies. PLoS Med. 8 (4), e1000433. http://dx.doi.org/10.1371/journal.pmed.1000433.

Bernhart, M.H., Wiadnyana, I.G.P., Wihardjo, H., Pohan, I., 1999. Patient satisfaction in developing countries. Soc. Sci. Med. 48 (8), 989–996. http://dx.doi.org/10.1016/S0277-9536(98)00376-1.

Bonfrer, I., Soeters, R., Van de Poel, E., Basenya, O., Longin, G., van de Looij, F., van Doorslaer, E., 2014a. Introduction of performance-based financing in Burundi was associated with improvements in care and quality. Health Aff. 33 (12), 2179–2187. http://dx.doi.org/10.1377/hlthaff.2014.0081.

Bonfrer, I., Van de Poel, E., Van Doorslaer, E., 2014b. The effects of performance incentives on the utilization and quality of maternal and child care in Burundi. Soc. Sci. Med. 123 (0), 96–104. http://dx.doi.org/10.1016/j.socscimed.2014.11.004.

Campbell, S., Reeves, D., Kontopantelis, E., Middleton, E., Sibbald, B., Roland, M., 2007. Quality of primary care in England with the introduction of pay for performance. N. Engl. J. Med. 357 (2), 181–190. http://dx.doi.org/10.1056/NEJMsr065990.

Cordaid-SINA Health, 2014. In: Soeters, R. (Ed.), PBF in Action: Theories and Instruments, PBF Course Guide. Cordaid-SINA Health, The Hague.

Crow, R., Gage, H., Hampson, S., Hart, J., Kimber, A., Storey, L., Thomas, H., 2002. The Measurement of Satisfaction with Healthcare: Implications for Practice from a Systematic Review of the Literature: Core Research.

Dagger, T.S., Sweeney, J.C., Johnson, L.W., 2007. A hierarchical model of health service quality scale development and investigation of an integrated model. J. Serv. Res. 10 (2), 123–142.

Donabedian, A., 1988. The quality of care: how can it be assessed? Jama 260 (12), 1743–1748.

Filmer, D., Pritchett, L., 2001. Estimating wealth effects without expenditure data-or tears: an application to educational enrollments in states of India. Demography 38 (1), 115–132.

Fritsche, G., Soeters, R., Meessen, B., 2014. Performance-based Financing Toolkit. World Bank, Washington D.C.

Gerber, G.J., Prince, P.N., 1999. Measuring client satisfaction with assertive community treatment. Psychiatr. Serv. 50 (4), 546–550. http://dx.doi.org/10.1176/ps.50.4.546.

Greene, S., Nash, D., 2009. Pay for performance: an overview of the literature. Am. J. Med. Qual. 24 (2), 140–163.

Hall, J.A., Dornan, M.C., 1990. Patient sociodemographic characteristics as predictors of satisfaction with medical care: a meta-analysis. Soc. Sci. Med. 30 (7), 811–818. http://dx.doi.org/10.1016/0277-9536(90)90205-7.

Hekkert, K.D., Cihangir, S., Kleefstra, S.M., van den Berg, B., Kool, R.B., 2009. Patient satisfaction revisited: a multilevel approach. Soc. Sci. Med. 69 (1), 68–75. http://dx.doi.org/10.1016/j.socscimed.2009.04.016.

Hutchinson, P.L., Do, M., Agha, S., 2011. Measuring client satisfaction and the quality of family planning services: a comparative analysis of public and private health facilities in Tanzania, Kenya and Ghana. BMC Health Serv. Res. 11 (1), 203.

Ireland, M., Paul, E., Dujardin, B., 2011. Can performance-based financing be used to reform health systems in developing countries? Bull. World Health Organ 89 (9), 695–698. http://dx.doi.org/10.2471/blt.11.087379.

Kolenikov, S., Angeles, G., 2009. Socioeconomic status measurement with discrete proxy variables: is principal component analysis a reliable answer? Rev. Income Wealth 55 (1), 128–165.

Meessen, B., Soucat, A., Sekabaraga, C., 2011. Performance-based financing: just a donor fad or a catalyst towards comprehensive health-care reform? Bull. World Health Organ. 89 (2), 153–156. http://dx.doi.org/10.2471/blt.10.077339.

Mpinga, E.K., Chastonay, P., 2011. Patient satisfaction studies and the monitoring of the right to health: some thoughts based on a review of the literature. Glob. J. Health Sci. 3 (1), p64.

Peterson, L., Woodard, L., Urech, T., Daw, C., Sookanan, S., 2006. Does pay-for-performance improve the quality of health care? Ann. Intern. Med. 145, 265–272.

Rao, K.D., Peters, D.H., Bandeen-Roche, K., 2006. Towards Patient-centered Health Services in India—a Scale to Measure Patient Perceptions of Quality, vol. 18.

Rosenthal, M.B., Fernandopulle, R., Song, H.R., Landon, B., 2004. Paying for quality: providers' incentives for quality improvement. Health Aff. 23 (2), 127–141. http://dx.doi.org/10.1377/hlthaff.23.2.127.

Sitzia, J., Wood, N., 1997. Patient satisfaction: a review of issues and concepts. Soc. Sci. Med. 45 (12), 1829–1843. http://dx.doi.org/10.1016/S0277-9536(97)00128-7.

Soeters, R., Peerenboom, P., Mushagalusa, P., Kimanuka, C., 2011. Performance-based financing experiment improved health care in the democratic Republic of Congo. Health Aff. (Millwood) 30 (8), 1518–1527. http://dx.doi.org/10.1377/hlthaff.2009.0019.

World Health Organization, 2000. The World Health Report 2000. Health Systems: Improving Performance. World Health Organization, Geneva.

Young, G.J., Meterko, M., Desai, K.R., 2000. Patient satisfaction with hospital care: effects of demographic and institutional characteristics. Med. Care 38 (3), 325–334.