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The impact of public reporting of patient experience scores on quality of care in South African private hospitals, 2010-2019: An observational study

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DEPARTMENT OF PUBLIC HEALTH

RESEARCH REPORT

The impact of public reporting of patient experience scores on quality of care in South African private hospitals, 2010-2019: An observational study

A Research report submitted to the School of Public Health

Faculty of Health Sciences, University of Witwatersrand

In partial fulfilment of the requirements for the degree of Master of Public Health

Submitted by Nabeela Cassim

Student number: 448896

Johannesburg, August 2024

DECLARATION

I, Nabeela Cassim declare that this Research Report is my own, unaided work. It is being submitted for the Degree of Master of Public Health (MPH) at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.

Nabeela Cassim

(Signature of candidate)

29th day of August 2024 in Johannesburg

Abstract

Background: This study investigates public reporting in South Africa, specifically focusing on the impact of a large medical aid administrator's decision to publicly disclose patient experience scores, from private hospitals. The administrator initiated patient-experience surveys in 2010, to assess healthcare quality within private hospitals and shared the results confidentially with hospital groups. In 2015, the administrator began publicly reporting these scores. However, the impact of this public reporting initiative has not been formally evaluated, prompting the need for this research.

Methods: This research is a longitudinal observational study, analysing patient experience surveys from South African private hospitals between 2010-2019. The surveys, based on the HCAHPS tool, comprised 26 questions covering eight key hospital experience categories, using a 5-Point Likert scale for responses. The analysis involved calculating composite scores from data that used Principal Component Analysis (PCA) to weight survey categories. Multiple linear regression was applied to assess the impact of Public Reporting (PR), adjusting for hospital group, size, and province. Interrupted Time-Series (ITS) analysis was also employed to discern trends and shifts in patient experience scores before and after the PR intervention in 2015. This method, using segmented regression, was instrumental in evaluating changes in trends and levels of scores at the point of intervention. This analytical approach aimed to unravel the nuances of PR's impact on patient care quality in private South African hospitals.

Results: The results showed that the highest survey response (59,368) occurred in 2015, the year of PR implementation. The analysis demonstrated a statistically significant 5 percentage points increase in patient experience scores post-PR, with larger hospitals generally scoring lower than smaller ones. ITS analysis indicated a consistent annual increase in scores following PR. Sub-category analysis revealed major improvements in nursing care and medication information. Shorrock's decomposition analysis identified these areas as major contributors to the variance in patient experience scores, accounting for 18% each.

Conclusions: This study reveals that public reporting in South African private hospitals resulted in an immediate, if modest, improvement in the level and trend of patient experience scores. The observed change underscores the potential of PR as a valuable tool in elevating perceived healthcare quality. These findings illuminate the effectiveness of PR as a catalyst for positive change and pave the way for further research and strategies to achieve sustained improvements in patient-centred healthcare.

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List of Abbreviations

AHRQ	Agency for Healthcare Research and Quality
AMI	Acute Myocardial Infarction
CABG	Coronary Artery Bypass Graft
CI	Confidence Interval
CMS	Centre for Medicare and Medicaid Services
EPOS	Effective Practice and Organisation of Care
HAI	Hospital Acquired Infection
HASA	Hospital Association of South Africa
HCAHPS	Hospital Consumer Assessment of Healthcare Providers and Systems
HMI	Health Market Inquiry: Final Findings and Recommendations Report
HQA	Health Quality Assessment
ITS	Interrupted Time Series Analysis
NHI	National Health Insurance
NHN	National Hospital Network
OLS	Ordinary Least Squares
PCA	Principal Component Analysis
PR	Public reporting
PREMs	Patient Reported Experience Measures
RCT	Randomised Controlled Trials
SA	South Africa
SQL	Structured Query Language
UK	United Kingdom
USA	United States of America
WHO	World Health Organisation

1. Chapter 1: Introduction

1.1. Background

In May 2010, a large South African medical aid administrator launched a survey to obtain comparative information about the quality of healthcare experienced in private hospitals, from the members of the medical schemes it administered. This information was then shared confidentially with hospital groups on a quarterly basis to highlight potential areas of improvement, even though some of these hospital groups already administered their own patient experience surveys.

The content of the survey initiated by the medical aid administrator is closely based on the survey developed in the United States of America (USA) by the Agency for Healthcare Research and Quality (AHRQ) and implemented by the Centre for Medicare & Medicaid Services (CMS) as the Hospital Consumer Assessment of Healthcare Providers and Systems Survey (HCAHPS Survey). The HCAHPS survey is a yardstick used by numerous hospitals in the USA and across Europe, to evaluate patients' experience of care received whilst admitted into hospital (1–4). This Patient Reported Experience Measures (PREMs) survey encompasses eight critical categories that impact patient experience in hospital (4).

In 2014, the medical aid administrator began engagements with South African private hospital groups, explaining their intention to publish the patient experience scores of these private hospitals in the public domain. This was implemented in 2015, enabling members of the scheme to view the results of the patient experience surveys for all South African private hospitals online. However, the impact of this public reporting (PR) has not been formally evaluated, which is what this research aims to address.

1.2. Literature Review

1.2.1. Patient experience as a quality measure

Quality of care is defined by the World Health Organisation (WHO) as the conditions of health services that increase the probability of favourable health outcomes (5). Hospital quality indicators can be categorised into; (i) clinical outcomes expressed usually as mortality and readmission rates; (ii) patient safety indicators (occurrence of adverse events) and (iii) patient experience and outcomes measures (5,6).

Patient experience describes a patient's subjective ability to evaluate their perceptions, preferences, and experiences with various domains of quality, such as communication, environment, and overall satisfaction (7,8). These service domains of care are well defined in the HCAHPS survey as eight sub-categories, namely:

- care from nurses,
- staff responsiveness,
- care from doctors,
- hospital environment,
- pain management,
- medication information,
- discharge information and
- overall hospital rating.

The advantage of measuring patient experience is that information is easy to collect, and it provides valuable insights into areas of improvement.

Assessing patient experience supports patient-focused healthcare which involves customising healthcare services and decisions to fit each patient's needs, values, and preferences (9). By comprehending patient viewpoints, healthcare providers can improve patient involvement in shared decision-making and work together throughout the patient's care experience (9).

There are numerous studies looking at the relationship between patient experience and other clinical outcomes of quality of care. These studies are important to determine whether higher patient-reported quality of care is associated with better clinical outcomes, and to determine whether focus on patient experience is at the detriment to other areas of quality. This refers to the opportunity cost that may come from hospitals allocating resources to improve specific domains of HCAHPS surveys, instead of investing in digital health technologies for instance, like at-home monitoring devices that reduce hospital length of stay and allow patients to recover in the comfort of their homes (10).

The published studies are inconsistent in proving a relationship between HCAHPS experience scores and clinical outcomes. There has been no statistical significance when assessing association between high patient experience scores and positive clinical outcomes following lumbar spine surgery, lung cancer surgery and lung resection and total hip arthroplasties (1–4). However, the HCHAPS survey reveals interesting findings from specific sub-categories of patient experience that may relate to clinical outcomes.

Looking at specific sub-categories in the HCAHPS survey provides useful information about health outcome indicators. High performance in sub-categories related to 'treatment received from doctors', 'treatment received from nurses' and 'discharge information' were shown to contribute to reduced readmission rates, mortality rates and medication errors (3,4,11–16). Interestingly, the relationship between higher patient experience scores and reduced readmission rates was found more consistently than an impact on mortality rates (3,13,17). Studies suggest that this may be because mortality is linked to severity of illness and not only hospital-related elements of care, even though these analyses are usually risk-adjusted for this reason (13,18).

1.2.2. Information asymmetry and public reporting

A credence good in economic terms refers to goods or services in which a consumer in unable to accurately assess their quality, even after consumption or usage (19). Healthcare services are usually considered credence goods (19,20). This is because patients lack the expertise or knowledge to know whether they are receiving quality healthcare, so the provider is trusted to make decisions about their treatment (20). This leads to information asymmetry in the healthcare system, and a relationship between price and demand where providers may overcharge patients for services that are an inferior standard, as patients are not able to accurately assess the quality of care (20).

The fundamental principle that underlies public reporting in private healthcare is its capacity to stimulate competition among healthcare providers. This mechanism empowers consumers with accessible information and is a strategy to overcome information asymmetry associated with credence goods. PR enables patients to make informed choices that favour higher quality healthcare services, thereby exerting an influence on market dynamics within the industry. While it is true that privately insured individuals in South Africa often have the privilege of selecting high-quality healthcare

providers, this is not the full picture. In the public sector, people are typically limited to whatever providers are available. However, even within the privately insured population, network arrangements and plan types can restrict members' ability to choose providers freely. More importantly, the role of medical schemes and their administrators extends beyond patient choice. They are responsible for leveraging data to ensure that only high-quality providers are included in networks. This means that it is not just about offering choices to patients but also about using the collective purchasing power of pooled purchasers to discipline and exclude providers who do not meet the required standards from these networks.

Public reporting is gaining traction in the present healthcare landscape that places transparency, accountability, quality improvement and cost-effectiveness at the forefront of healthcare delivery (21). In a demand-driven healthcare environment, there is growing interest by policymakers, funders, and patients in measuring performance as a means of enhancing the overall quality of healthcare services (21).

1.2.3. The use of public reporting as a quality strategy

Public reporting is a quality strategy that refers to the dissemination of information referring to performance-related measures (e.g., patient experience scores) to potential consumers, using comparative data that is obtained systematically, about identifiable providers (institutions or health care professionals) (22,23). This practice of public reporting is common in countries like the United States of America (USA), Denmark, Austria, Estonia, France, Germany, Italy, Singapore, Australia, United Kingdom (UK) and the Netherlands (3,4). Platforms that are used in the distribution of quality-related data in the public domain are scorecards or report cards for institutions or healthcare providers and websites or reports that are published by independent regulatory bodies, government departments or healthcare institutions (23). Comparative quality indicators such as mortality rate, hospital acquired infections (HAIs) and patient experience scores are publicly available in the form of report cards and star ratings on websites in the USA, while in Australia, the MyHospitals website publicly reports hospital performance nationally (24–26).

In South Africa, some private hospital groups have begun reporting their patient experience scores, however this may be biased to reflect a more favourable views as the surveys are not well-designed, the response rates are not representative, and the

hospitals may misrepresent the results. The results from these surveys are also not directly comparable to one another (27). Discovery Health has recently released the Hospital Quality Scorecard that compares hospitals quality metrics against each other, but their methodology has been contested by private hospital groups (18).

As noted in the 2019 Health Market Inquiry (HMI) report, the South African private healthcare market is characterised by rising costs and overutilization, that have not translated into improved health outcomes (27). Factors that were noted as hindering competition were information asymmetry between consumers and providers, lack of value-based contracting, limited regulation of healthcare practitioners and concentrated healthcare markets (27). The HMI called for a competitive environment that prioritises cost, price and quality of care and the need for comparative information gathering and sharing of publicly available data on performance of providers (27).

Three major hospital groups, specifically Netcare, Mediclinic, and Life Healthcare, have established a dominant presence in South Africa. These influential hospital groups have consistently generated substantial profits and have created formidable barriers for new entrants seeking fair competition and are seen as an oligopoly in the industry (27). However, independent hospitals affiliated with the National Hospital Network (NHN) fall under an exemption from the Competition Act 89 of 1998, which allows NHN to engage in collective bargaining, global fee negotiations and centralised procurement on behalf of their members (27). This is intended to bolster their competitiveness. While it generally helps them, the renewal of the exemption has introduced more onerous reporting requirements for these individual hospitals compared to the big three groups (27). The highly concentrated nature of the health facilities market, both at the national and local levels, raises concerns about potential collusion among major players and the challenges faced by funders in effectively regulating and disciplining these hospital groups (27). Public reporting is a tool that could be of value to address these concerns in South Africa.

It is contested as to whether publicly reporting on patient experience alone, contributes to improvement in quality measures (9,11,28). The consensus from the literature indicates that this relationship is largely assumed, rather than proven (9). However patient experience, together with other quality measures have greater potential to improve quality of healthcare (9,11,28).

1.2.4. Pathways for the impact of public reporting

Public reporting of quality data has been in existence for 30 years and it is assumed to be an effective health policy tool (22,29,30). It does this by assigning a measurement of value to performance, thereby creating comparative information about the quality provided by different providers in the healthcare industry (high quality versus poor quality of care). The act of public reporting leads to change via two main pathways, depicted in Figure 1.1; (i) the selection pathway empowers patients to select high quality providers and the (ii) the intrinsic-change pathway which incentivises providers to improve quality of care (22,29,30).

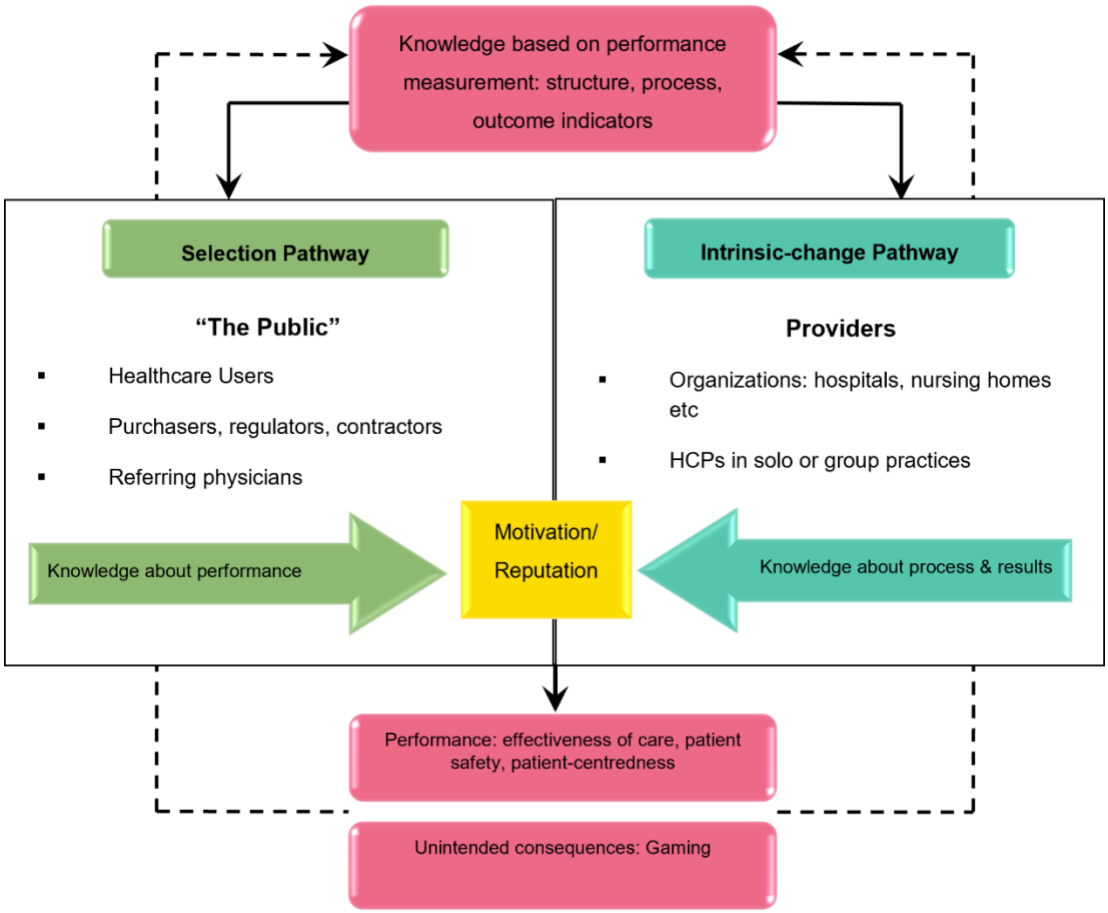


Figure 1.1: Pathways of change of public reporting (29,31)

(i) Pathway I: The Selection Pathway

The selection pathway focuses on consumers of healthcare services that respond to public reporting. Consumers may use publicly available comparative healthcare data to reduce information asymmetry between patient and provider, thus enabling them to

choose high quality providers (22,29,31). A patient's choice depends on the availability of alternatives and their awareness of, and ability to interact with, PR data.

The results of a range of qualitative studies measuring consumer use of PR vary. For example, the reporting of technical topics, such as hospital-acquired infection (HAI) rates may be confusing to consumers (32,33). Those with tertiary education were more likely to engage with PR data (32,33). PR alone doesn't affect consumers choice, with factors such as: distance; cost; referring providers' and families' opinions; and history with provider all having impact (29,32–36). In the case of PR condition-specific mortality report cards, studies show that consumers that relate to the condition being measured, are more likely to interact with the data, and display preferences for higher performers (16,37,38). These findings illustrate that PR is useful when patients understand or have personal interest in the measures being reported.

Market power, is transferred to the consumer by driving volumes to higher quality providers, thereby inciting competition between providers (22,31,39). This pathway assumes that consumers behave rationally, and act in their own best interest by choosing healthcare providers that offer higher quality services. It should have a Darwinian outcome by promoting competition among providers and encouraging the selection of those with superior quality outcomes (29,40).

There are inconsistencies in the literature around whether public reporting affects market share (15,29,37,41). Several studies have found that providers that are publicly rated as low performers, subsequently lost market share, while the converse was found for high performing hospitals (15,29,37,41). Interestingly, one study that used scorecards to publicly report on the performance of surgeons, found that volumes and market share of low-performing decreased, but the volume transferred to high-performing surgeons didn't increase significantly (37).

Another study that used score cards to publicly report on risk-adjusted mortality rates of coronary artery bypass graft (CABG) patients showed that low-mortality hospitals increased in market share, six months after PR by a relative change of 8.9% in adjusted mean market share (14,42). Through the selection pathway, consumers do appear to drive volumes to providers that are rated as high quality, although a limitation of these studies is their small sample size or relatively small effects (14,29,34,36).

(ii) Pathway II: The Intrinsic-change Pathway

Consumer's preference for "good performers" does not mean that "bad performers" immediately need to exit the market (22). Instead, in the "intrinsic-change pathway", public reporting of quality information allows for peer review in the healthcare industry, enabling identification of underperformance relative to one's peers (22). Public reporting acts as a driver for providers to improve their performance, by making changes within their organisation (22).

It can be argued that the intrinsic-change pathway may work just as well by sharing peer-reviewed comparative data privately, to underperforming providers who could change their behaviour (22). However, what makes public reporting effective is that the threat of reputational damage and associated financial losses encourage improvement in quality of care (22,29). With the popularity of Value Based Contracting, many countries combine PR with financial incentives (43). This model is also commonly known as Pay-for-Quality or Pay-for-Performance (43).

The key principles underlying these models is that upfront measurable quality targets are agreed to by provider and funder, and that providers are financially remunerated over and above their basic service fees if they accomplish those targets (43,44). Focus areas for these types of interventions are preventative care and disease management of chronic conditions, as funders would prefer that patients are clinically managed to avoid progression of disease that may lead to later hospitalisation or complications (43,44). This is common practice with individual providers in managed care environments in South African scheme administrators. An example is financially incentivizing doctors for improved HbA1c levels in members registered on chronic for diabetes on a medical scheme (45).

Quantitative studies have found that in hospitals, palliative care and nursing homes, the act of public reporting together with financial incentives resulted in increased quality initiatives and outcomes in these facilities (29,46–48). A retrospective statistical study found that publicly reporting of nursing home's clinical quality led to higher demand by consumers (47). Pre-post intervention studies of hospitals in Germany used linear regression models to show statistically significant improvement in quality measures, with most improvement seen directly after public reporting, or in hospitals with low baseline performance (41,49).

However, other retrospective studies found little or no improvement on quality performance measures by providers of healthcare (hospitals and healthcare practitioners) (31,38,50–52). However, systemic reviews have demonstrated that PR leads to statistically significant improvement in quality in healthcare facilities (hospitals, nursing homes etc.), but insignificant impact on individual health professional level (30,37,52–54). This could be due to resource allocation, whereby healthcare facilities (e.g., hospital groups) have more resources to spend on improving quality measures, whereas individual providers may lack this capacity, especially in private practice. Aggregation of facility level data may also explain why PR has a bigger impact in hospital than individual provider performance data.

A few studies have also noted unintended consequences of PR, which is called “gaming” in economic terms. “Gaming”, in this scenario refers to the behaviours used by healthcare providers to manipulate their measured outcomes or results, to seem more favourable (53). This could include providers engaging in “cherry-picking” whereby they selectively treat low-risk patients for performance scores to remain high (29,37). Risk aversion may occur, for example where surgeons choose not to operate on high-risk patients even though it might by the necessary treatment, to reduce their mortality rate if this is publicly reported (29,37). The main driver behind this behaviour is reputation (53). Providers want to be seen in a positive light with patients and fellow colleagues, due to the professional and financial implications.

1.3. Problem Statement

The problem addressed in this report pertains to the limited attention given to the quality of care provided by South African hospitals associated with the major private hospital groups, namely Netcare, Life Healthcare, Mediclinic, and National Hospital Network. In this context, a South African medical administrator employs an HCAHPS-inspired survey to assess patient experiences within these hospitals and subsequently discloses this data to the public. However, a critical research gap exists regarding the impact of public reporting (PR) on patient experience scores in these facilities, which this research report aims to address.

1.4. Justification

This study is justified by three main factors. Firstly, there is a need to enhance the transparency and accountability of healthcare providers to reduce information

asymmetry, which PR aims to accomplish. Secondly, as patient experience is central to healthcare quality, an understanding of how PR impacts these experiences is needed to facilitate improvements in healthcare. Lastly, this research has the potential to offer valuable insights to policymakers, hospital administrators, and the public on the impact of PR as a quality strategy.

By addressing the gap in research around the impact of PR in South Africa, there is an opportunity for informed decision-making, the enhancement of healthcare quality, and the empowerment of patients to make informed choices about their healthcare providers. In doing so, this study promises to contribute to the advancement of healthcare in South Africa and potentially serves as a model for similar inquiries in other regions.

1.5. Research Question

Did publicly reporting on patient experience scores result in quality-of-care improvements in private hospitals in South Africa?

1.6. Research Aim

The aim of this research paper is to examine the impact of public reporting on patient experience scores in four prominent private hospital groups in South Africa.

The study aims to provide a thorough analysis of patient experience score trends from 2010 to 2019, investigate the influence of public reporting, considering hospital group and provincial location, determine if public reporting leads to increased composite scores, and identify the sub-category most significantly associated with changes in composite scores due to the impact of public reporting within these hospital groups.

1.7. Research Objective

(i) To summarise the study outcomes for the four main private hospital groups in South Africa from 2010 to 2019

(ii) To assess the impact of public reporting on average patient experience scores in South Africa's four major private hospital groups, examining both pre- and post-implementation changes and the role of hospital group in these outcomes

(iii) To investigate the effect of public reporting on the trend of patient experience scores across South Africa's four primary private hospital groups between 2010 and 2019

(iv) To analyse how public reporting influenced specific sub-category trends from 2010 to 2019 and identify key sub-categories driving changes in overall patient experience scores within South Africa's four leading private hospital groups.

2. Chapter 2: Methodology

2.1 Primary Study

2.1.1 Background

The primary study was a hospital quality monitoring study conducted by a medical aid administrator.

2.1.2 Study Design

The primary study was a longitudinal study of patient experiences of hospital admission in private hospitals in South Africa.

2.1.3 Study Setting

The study setting was private hospital care provided by the four main private hospital groups in South Africa.

2.1.4 Study Population

The primary study population was insured patients from a large medical aid admitted to acute private hospitals in South Africa. For members to have been eligible for completing the survey, they had to have been active on the medical aid for a minimum of 12 months prior to being admitted to the hospital.

2.1.5 Study Sample

All eligible members were included in the primary study. The study sample for the patient experience data included the responses of patients admitted to private generalised hospitals in South Africa who had answered the survey, were greater than 18 years of age, and excluded duplicate responses.

2.1.6 Data Collection

Patient experience surveys were sent out to members within seven days after a hospital discharge. This was done through an email with a link to complete the survey online via a platform hosted by Survey Monkey™. The data from the completed surveys was then downloaded onto internal storage systems for further analysis by the medical aid administrator. At this point, the data was made up of responses to the

survey questions and unique identifiers for the members and the related hospital admission.

Between 2010-2019, approximately 200,000 surveys were sent out annually to members, with approximately 128 private hospitals having at least 50 survey responses annually, across the entire period. On average, the response rate of members completing the survey was approximately 25%.

2.1.7 Data Measurement

For the patient experience data, the primary measurement tool is based on the HCAHPS survey tool (shown in Appendix D). It asks discharged patients 26 questions. 17 questions cover the eight categories of hospital experience:

1. treatment from nurses (three questions),
2. staff responsiveness (two questions),
3. treatment from doctors (three questions),
4. hospital environment (two questions),
5. pain management (two questions),
6. medication information (two questions),
7. discharge information (two questions) and
8. overall hospital rating (one question).

The remaining questions were specific to the member to allow for screening and risk-adjustment in the South African setting, and finally, there was a question that allowed free-text comments. The structure of the survey questions is summarised in Appendix E. The response options provided to patients were in the form of a 5-Point Likert scale (with answers ranging from Never/Sometimes/Usually/Always/I don't know). The responses for each category were grouped together for analysis using the top box scoring approach which aggregates the most favourable affirmative responses and provides a consolidated metric that reflects the most positive evaluations within the surveyed patient experiences.

2.2 Secondary Study

2.2.1. Study Design

The study design was longitudinal, allowing for the tracking of outcomes and variables over time. It adopted an observational approach, relying on the analysis of pre-existing data without intervening in natural events. The methodological approach involved secondary data analysis, extracting, processing, and analysing existing data to explore trends over time.

2.2.2. Study Setting

The study setting was private hospital care provided by the four main private hospital groups in South Africa.

2.2.3. Study Population

The secondary study population was private hospitals with at least 50 completed surveys. On average per year, 42% of private hospitals have at least 50 completed surveys.

2.2.4. Study Sample

The patient experience data aggregated the results of all patients that have completed the survey. The focus of this secondary analysis was on hospitals from the four main private hospital groups as they collectively own more than 80% of private sector beds. Smaller, independent hospital groups were excluded due to small volumes of hospitals (approximately 18).

The decision to focus on hospitals from the four main private hospital groups was justified by considerations of representation and generalisability of the patient experience and statistical significance, as larger volumes of data allow for more robust analysis.

The study period of 2010-2019 was justified based on the need to have sufficient years before and after the intervention of PR, consistent participation of private hospitals, and a meaningful response rate. This timeframe allowed for a comprehensive and in-depth exploration of patient experiences within the context of PR interventions across the leading private hospital groups.

2.2.5. Data Processing

(i) Step One: Obtaining the data

The hospital-level patient experience scores for all private hospitals in South Africa for the period of 2010-2019 was received from the medical aid administrator in a Microsoft Excel workbook. The summary hospital data was already risk-adjusted as explained in Appendix F.

The workbook contained patient experience scores generated from the HCAHPS-inspired survey, expressed as top box percentages for individual sub-categories, and as a composite total score, which is the sum of all sub-categories multiplied by their respective PCA weights. These scores were compiled annually for each individual private hospital. The dataset also included other details such as the yearly response count for each private hospital, the provincial location, and the size of each hospital. Hospital size was classified based on bed capacity, with small hospitals having fewer than 94 beds, medium-sized hospitals ranging between 95 and 184 beds, and larger hospitals having more than 185 beds.

(ii) Step Two: Data cleaning, converting, and categorising relevant data points

The Excel workbook was imported into Stata 17 for further manipulation and analysis. Data was categorised into the four main hospital groups in South Africa. The small remainder of hospitals that belonged to other hospital groups were deleted from the dataset. Data was then anonymised by assigning a study code to each hospital per year.

(iii) Step Three: Weighting against number of responses

Hospitals vary in size and patient numbers so should not count equally when hospital data is aggregated. Weighting is a crucial method employed to rectify potential biases, elevate the accuracy of survey outcomes, and bolster the reliability and validity of findings when aggregating them to a broader population (54). In this study, a weighted average was calculated for each sub-sub-category as well as the composite (total) score when aggregating to the hospital group and total sample levels. This involved assigning weights to scores based on the number of responses for each hospital in each year. Doing this ensured that each hospital's contribution was appropriately represented in any aggregated results.

(iv) Step Four: Analysing hospital level data

The results of the study underwent a thorough examination on an annual basis, with a specific focus on differentiating between two distinct temporal periods: the era preceding the initiation of public reporting, spanning from 2010 to 2014, and the subsequent period after the introduction of public reporting measures, extending from 2015 to 2019. This analysis aimed to evaluate any temporal shifts or trends in patient experience scores over the specified periods.

2.2.6. Variables

The outcome variables, predictor variables and confounding variables that are applicable to this study are described in Table 2.1. Outcome variables refer to the specific areas of interest or measures that were observed and analysed to assess the impact of predictor variables, particularly in the context of public reporting. They are the key elements or factors under scrutiny, and by observing variations in these outcome variables, the study aims to draw conclusions regarding the success or impact of public reporting initiatives. Risk adjustments were applied to outcomes using factors such as self-rated health, language, education status, gender, age, survey response lag, and admission type (medical/surgical) for enhanced comparability (Appendix F).

Confounding variables are often related to both the outcome and predicted variables, which can lead to the appearance of a false relationship between the two. The potential confounders in this study are:

(i) Hospital size: Patient experience in medium or large hospitals has been found to be lower in all survey sub-categories compared to larger hospitals (4,55–57).

(ii) Hospital province: South Africa's largest populations are found in Gauteng, Kwa-Zulu Natal, and Western Cape, listed in descending order. Variation in patient experience scores may be affected by population size in respective provinces. Furthermore, research has shown that patient experience scores are lower in disadvantaged areas (58).

Table 2.1: Description of variables used in the study

Category	Variable	Description	Type of data	Transformation
Outcome variables	Total composite score	Proportion of patients with top box scores averaged across the 8 sub-categories	Numerical Score out of 100	
	Sub-category patient experience scores	Proportion of patients with top box scores for each of the 8 sub-categories: • care from nurses • staff responsiveness • care from doctors • hospital environment • pain management • medication information • discharge information • hospital rating	Numerical Score out of 100	
Predictor variables	Year	Year between 2010 and 2019	Numerical	
	Period	Indicator in relation to introduction of public reporting	Binary	Coded into: 1 – Before (2010-2014) 2 – After (2015-2019)
	Hospital group	Life Healthcare, Mediclinic, Netcare and the National Hospital Network were the hospital groups used	Categorical	Coded into anonymous categories as follows: A, B, C and D
Confounding variables	Hospital size	Hospitals are classified based on bed capacity: • small hospitals (fewer than 94 beds) • medium-sized hospitals (95-184 beds) • large hospitals (more than 185 beds)	Categorical	Coded into categories as follows: 1- small, 2- medium 3- large
	Province	Geographical division of the country into its nine provinces. Each province represents a distinct administrative region with its own government and specific geographical boundaries	Categorical	Coded into categories as follows: Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape and North-West

2.3 Data Analysis

Data analyses was performed using the statistical program Stata 17.

2.3.1. Objective One: To summarise study outcomes

Descriptive statistics were used to summarise the study sample of patient experience scores data for the four main private hospital groups in South Africa from 2010 to 2019. First, the composite scores for each hospital in the study sample was weighted by its respective number of responses.

A table was created, which summarised the composite scores for each year between 2010 and 2019, according to categories such as hospital group, size and province. Finally, line graphs were produced to depict the trend of the composite scores according to these categories. To supplement the analysis, a line graph was also produced to depict the number of responses per hospital group.

2.3.2. Objective Two: To assess impact of PR

A common approach to test whether an intervention has had an impact before and after implementation is a pre-post study design (59,60). This design compares the mean or proportions before and after intervention using simple hypothesis tests. If results are found to be statistically significant, it is assumed that the intervention has been successful.

This approach was implemented in a multiple linear regression framework using the composite patient experience scores as the outcome variable. The main exposure variable was the dummy variable indicating the period before (2010-2014) or after (2015-2019) the introduction of public reporting. Two analytical models were used.

(i) In Model 1 we included hospital group, hospital size and province as explanatory variable that may also be associated with variation in composite patient experience scores. To aid in interpretation, the coefficients for hospital group and province are presented as contrasts from the overall mean rather than as contrasts from an arbitrary reference category.

(ii) In Model 2 we added the interaction between the hospital group and the period effect to test whether the impact of public reporting differed by

hospital group. Predictive marginal plots were used to present the interaction results.

Goodness of fit statistics such as the R-squared and Root Mean Square Error were used to evaluate the fit of the models.

2.3.3. Objective Three: To investigate the effect of PR on the trend of composite scores

To determine whether public reporting of patient experience scores results in an increase in composite (total) scores for the four main private hospital groups in South Africa, Interrupted Time-Series (ITS) analysis was used. The ITS analysis was performed using all hospitals combined. This enhances the statistical power as the analysis is conducted on a larger data set as opposed to conducting an ITS analysis per hospital group.

The main limitation of pre-post study designs, as undertaken for Objective 2, is that they fail to account for pre-existing time trends in the data and may overestimate impacts (60). ITS, therefore, provides a more robust analysis of intervention impact.

An observational study design was appropriate in this scenario, as randomisation of the exposure or intervention was not possible. The characteristics of this study make it ideal for ITS, as defined by the Effective Practice and Organisation of Care (EPOC) Cochrane Group (60). According to their definition, an ITS study should have at least three data points before and after intervention, an intervention that occurred at a specific point in time and lastly that it measures performance objectively (60).

ITS is a quasi-experimental design (61–66). This was appropriate as ITS in combination with segmented regression allows for measurement of the change due to intervention, while also controlling for overall trend in outcome (67).

In this case, ITS uses segmented regression to assess whether the intervention of public reporting has resulted in a change in composite (total) scores. Segmented regression is useful as it evaluates the trend before intervention, the change in the trend after the intervention and the shift in outcome levels at intervention point (60). This is displayed visually in Figure 2.1.

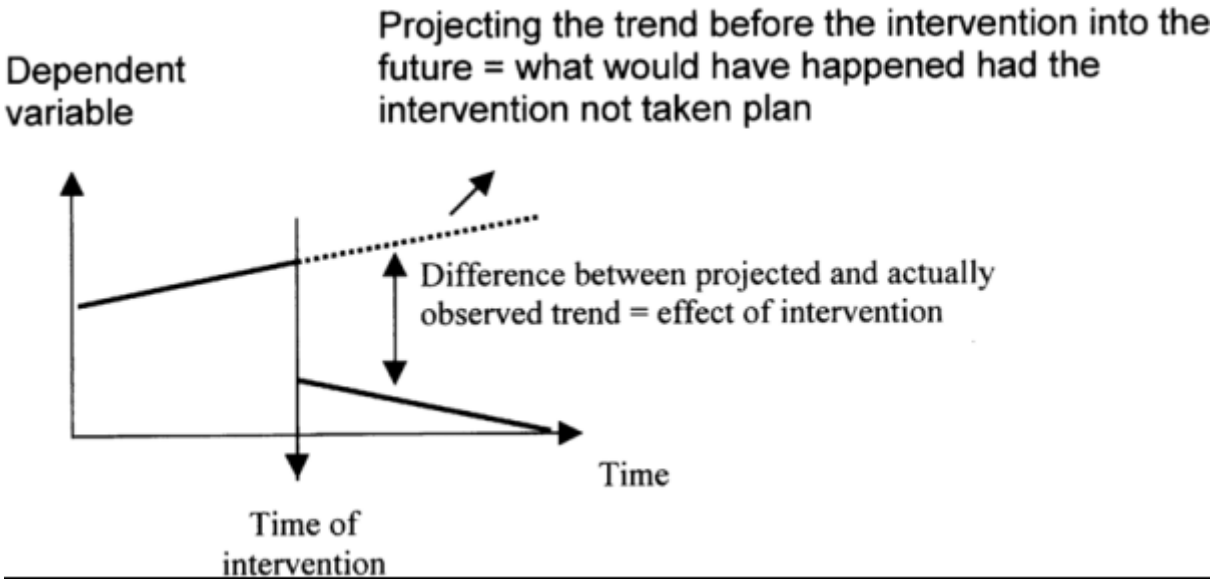


Figure 2.1: Logic of an Interrupted Time Series graph (68)

This was a single ITS analysis, as there was no control group, with the trend observed before public reporting being projected into the period after public reporting and serving as the counterfactual. The study had a sample of 10 points over time (5 before and 5 after public reporting) using the aggregated weighted average of the composite (total) score, for all hospital groups for each year. The intervention occurred in 2015, a plot was produced from the results of the regression to further illustrate the effects of the intervention.

The user-written 'itsa' ado command was used in Stata for the ITS analysis. We used the Newey-West standard errors and a lag period of 1 year for the autocorrelation. The command also produces the appropriate ITS plots (69).

2.3.4. Objective Four: To analyse how PR influenced certain sub-categories

A thorough analysis was conducted using the composite score from the entire dataset spanning from 2010 to 2019. This approach ensured a holistic representation of patient experience variation over time. The initial step involved an Interrupted Time Series (ITS) analysis of all sub-category survey scores, in line with the procedures outlined in Section 2.3.3.

This was followed by a decomposition analysis. Utilizing Shorrock's inequality decomposition method allowed a break-down of the annual composite scores of hospitals into their constituent sub-categories (70,71). This method is essential for

discerning variations in scores across different hospitals and time periods, thereby shedding light on the dynamic trends in each aspect of patient experience.

For the decomposition analysis in Stata, the user-written ado command ‘ineqfac’ was used (72). This command is designed to break down a dataset into component parts to understand the contribution of each part to the overall result.

2.4 Ethics

The privacy statement of the medical aid administrator has undergone a comprehensive review and received consent. Authorisation for data utilisation has been granted by the Research Governance Committee within the medical aid administrator. To ensure confidentiality, both the research student and the medical aid administrator signed a Non-Disclosure Agreement. The required patient experience score data for this research has been supplied by the medical aid administrator. It's important to note that individual patient data was not received; instead, aggregated data was provided per hospital group. In maintaining anonymity, hospital groups and names were anonymised for the purpose of this research. To facilitate the use of secondary data, an ethics waiver has been formally approved by the Wits Human Research Ethics Committee, which is referenced in Appendix B.

3. Chapter 3: Results

This section will present the key results from the data analysis undertaken to determine whether publicly reporting on patient experience scores results in quality of care improvements amongst private hospitals in South Africa. First, a description of the sample will be provided. Thereafter, an analysis will be outlined to answer each of the study objectives.

3.1. Objective One: To summarise study outcomes

3.1.1 Total responses

Table 3.1 shows the number of hospitals included in the analysis, by different hospital characteristics, over the period 2012 to 2019. Table 3.2 provides the distribution of responses to the HCAHPS-inspired patient experience surveys, by different hospital characteristics, over the period of 2010 to 2019. Interestingly, the highest number of survey responses (59 368) was seen in 2015, the year that public reporting was introduced. This could be indicative of effort taken by the four main private hospital groups in South Africa in trying to gather respondents in that year. The distribution of responses by hospital group (A-D), hospital size and hospital province showed consistent patterns over time.

Hospital Group C consistently received fewer responses in patient surveys compared to other groups, as shown in Figure 3.1. This lower response rate is attributed to Group C having fewer hospitals, operating on a unique model where independent hospitals join annually. All hospital groups displayed a similar trend over time: a general rise in survey responses from 2010 to 2012, a decrease in 2013, a rebound from 2013 to 2014, and a peak in 2015. This peak was followed by a decline in 2016, steady increases in 2017 and 2018, and finally a drop in 2019.The distribution of responses is proportional to hospital size as well as the number of hospitals in each group. Larger hospitals have the capacity for more beds, allowing for more admissions and therefore more responses from the HCAHPS-inspired survey. The distribution of responses across hospital size is consistent over the period of the study, meaning that there have been approximately the same number of responses each year.

The number of responses is listed by province, in order of total provincial population size from highest to lowest as reported by Stats SA (74). The distribution of survey

responses is not always proportional to the size of the population in each province. The Western Cape has higher responses than Kwa-Zulu-Natal, even though Kwa-Zulu-Natal has a higher population. Similarly, Limpopo has one of the lowest number of responses over time despite being the fourth largest province. Private hospital groups are heavily dependent on the medical scheme population which are found in more urban provinces which explains the variation in distribution of responses.

3.1.2 Composite patient scores

Table 3.3 shows the mean weighted composite score across the period 2010 to 2019 as well as the mean weighted composite score for each hospital group, hospital size and provincial location of the hospital.

Figure 3.2 indicates that the mean weighted composite score for all hospital groups has followed a similar trend over time. Hospital group D was shown to have the lowest score at each point in time whereas hospital group C was shown to have the highest score for many of the years. The trend in scores from 2010 to 2012 is relatively flat, followed by a steep increase from 2012 to 2015 across all groups. There is a drop in 2016, followed by another increase from 2016 to 2019. The lowest weighted composite score during this period was attained by hospital group D in 2013 at 53.95% and the highest was attained hospital group C in 2019 at 67.69%. This range of the weighted composite score indicates patient satisfaction.

Figure 3.3 indicates that the mean weighted composite score for all hospital sizes has followed a similar trend over time. Large hospitals were shown to have the lowest score at each point in time whereas small hospitals were shown to have the highest score across every year. The movement in scores from 2010 to 2013 is relatively flat, followed by a steep increase from 2013 to 2015 across all groups. There is a drop in 2016, followed by another increase from 2016 to 2019.

Figure 3.4 indicates that the mean weighted composite score for most hospital provinces has followed a similar trend over time. Similarly, figures 3.2 and 3.3 depict that the movement in scores from 2010 to 2013 is relatively flat, followed by a steep increase from 2013 to 2015. There is a drop in 2016, followed by another increase from 2016 to 2019.

Table 3.1: Number of hospitals, 2010-2019

	Year									
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Total hospitals	109	119	125	116	121	140	132	136	143	139
By hospital group										
A	34 (31.2%)	36 (30.3%)	36 (28.8%)	35 (30.2%)	36 (29.8%)	36 (25.7%)	36 (27.3%)	36 (26.5%)	36 (25.2%)	37 (26.6%)
B	32 (29.4%)	34 (28.6%)	36 (28.8%)	33 (28.4%)	36 (29.8%)	41 (29.3%)	39 (29.5%)	39 (28.7%)	41 (28.7%)	39 (28.1%)
C	10 (9.2%)	14 (11.8%)	17 (13.6%)	14 (12.1%)	16 (13.2%)	25 (17.9%)	21 (15.9%)	24 (17.6%)	27 (18.9%)	28 (20.1%)
D	33 (30.3%)	35 (29.4%)	36 (28.8%)	34 (29.3%)	33 (27.3%)	38 (27.1%)	36 (27.3%)	37 (27.2%)	39 (27.3%)	35 (25.2%)
By hospital size										
Small (0-94 beds)	10 (9.2%)	11 (9.2%)	15 (12%)	12 (10.3%)	13 (10.7%)	24 (17.1%)	17 (12.9%)	18 (13.2%)	21 (14.7%)	18 (12.9%)
Medium (95-184 beds)	45 (41.3%)	52 (43.7%)	54 (43.2%)	49 (42.2%)	52 (43%)	60 (42.9%)	52 (39.4%)	55 (40.4%)	57 (39.9%)	57 (41%)
Large (185+ beds)	54 (49.5%)	56 (47.1%)	56 (44.8%)	55 (47.4%)	56 (46.3%)	56 (40%)	63 (47.7%)	63 (46.3%)	65 (45.5%)	64 (46%)
By hospital province										
Gauteng	47 (43.1%)	48 (40.3%)	51 (40.8%)	48 (41.4%)	48 (39.7%)	54 (38.6%)	51 (38.6%)	53 (39%)	56 (39.2%)	54 (38.8%)
Kwa-Zulu-Natal	20 (18.3%)	23 (19.3%)	23 (18.4%)	21 (18.1%)	23 (19%)	26 (18.6%)	25 (18.9%)	26 (19.1%)	27 (18.9%)	28 (20.1%)
Western Cape	25 (22.9%)	28 (23.5%)	29 (23.2%)	28 (24.1%)	28 (23.1%)	30 (21.4%)	30 (22.7%)	31 (22.8%)	32 (22.4%)	31 (22.3%)
Eastern Cape	5 (4.6%)	5 (4.2%)	5 (4%)	5 (4.3%)	5 (4.1%)	6 (4.3%)	6 (4.5%)	6 (4.4%)	6 (4.2%)	6 (4.3%)
Limpopo	1 (0.9%)	2 (1.7%)	2 (1.6%)	2 (1.7%)	2 (1.7%)	2 (1.4%)	2 (1.5%)	2 (1.5%)	2 (1.4%)	2 (1.4%)
Mpumalanga	3 (2.8%)	4 (3.4%)	4 (3.2%)	4 (3.4%)	5 (4.1%)	6 (4.3%)	6 (4.5%)	5 (3.7%)	5 (3.5%)	5 (3.6%)
North-West	4 (3.7%)	5 (4.2%)	6 (4.8%)	4 (3.4%)	5 (4.1%)	9 (6.4%)	7 (5.3%)	7 (5.1%)	9 (6.3%)	7 (5%)
Free State	3 (2.8%)	3 (2.5%)	4 (3.2%)	3 (2.6%)	4 (3.3%)	5 (3.6%)	4 (3%)	4 (2.9%)	4 (2.8%)	4 (2.9%)
Northern Cape	1 (0.9%)	1 (0.8%)	1 (0.8%)	1 (0.9%)	1 (0.8%)	2 (1.4%)	1 (0.8%)	2 (1.5%)	2 (1.4%)	2 (1.4%)

Table 3.2: Number of hospital survey responses, 2010-2019

	Year									
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
No. of hospitals	109	119	125	116	121	140	132	136	143	139
No. of responses	23 570	32 744	42 599	30 084	32 154	59 368	38 307	42 519	51 543	42 801
No. of responses by hospital group										
A	7 624 (32.3%)	10 414 (32.2%)	13 466 (31.6%)	9 253 (30.8%)	9 696 (30.2%)	17 375 (29.3%)	11 583 (30.2%)	12 902 (30.3%)	15 555 (30.2%)	13 232 (30.9%)
B	6 122 (26.0%)	8 973 (27.7%)	11 077 (26.0%)	7 928 (26.4%)	9 068 (28.2%)	17 252 (29.1%)	10 789 (28.2%)	11 800 (27.8%)	14 039 (27.2%)	12 093 (28.3%)
C	1 205 (5.1%)	2 418 (7.5%)	3 694 (8.7%)	2 573 (8.6%)	3 160 (9.8%)	6 649 (11.2%)	4 185 (10.9%)	4 918 (11.6%)	6 280 (12.2%)	5 201 (12.2%)
D	8 619 (36.6%)	10 939 (32.6%)	14 362 (33.7%)	10 330 (34.3%)	10 230 (31.8%)	18 092 (30.5%)	11 750 (30.7%)	12 899 (30.3%)	15 669 (30.4%)	12 275 (28.7%)
No. of responses by hospital size										
Small (0-94 beds)	733 (3.1%)	984 (3.0%)	1523 (3.6%)	962 (3.2%)	1 204 (3.7%)	3 250 (5.5%)	1 842 (4.8%)	2 043 (4.8%)	2 708 (5.3%)	2 173 (5.1%)
Medium (95-184 beds)	7 040 (29.9%)	9 998 (30.9%)	13 206 (31.0%)	9 325 (31.0%)	10 196 (31.7%)	20 326 (34.2%)	11 810 (30.8%)	13 160 (31.0%)	16 273 (31.6%)	13 833 (32.3%)
Large (185+ beds)	15 797(67.0%)	21 762 (66.1%)	27 870 (65.4%)	19 797 (65.8%)	20 754 (64.5%)	35 792 (60.3%)	24 655 (64.4%)	27 316 (64.2%)	32 562 (63.2%)	26 795 (62.6%)
No. of responses by hospital province										
Gauteng	12 126 (51.4%)	16 457 (50.8%)	21 989 (51.6%)	15 540 (51.7%)	15 994 (49.7%)	28 905 (48.7%)	18 752 (49.0%)	20 712 (48.7%)	24 919 (48.3%)	20 902 (48.8%)
Kwa-Zulu-Natal	3 635 (15.4%)	4 991 (15.4%)	6 647 (15.6%)	4 765 (15.8%)	5 177 (16.1%)	9 521 (16.0%)	6 126 (16.0%)	6 807 (16.0%)	8 342 (16.2%)	6 565 (15.3%)
Western Cape	5 588 (23.7%)	7 721 (23.9%)	9 672 (22.7%)	6 833 (22.7%)	7 643 (23.8%)	14 314 (24.1%)	9 168 (23.9%)	10 123 (23.8%)	12 424 (24.1%)	10 372 (24.2%)
Eastern Cape	937 (4.0%)	1 191 (3.7%)	1 632 (3.8%)	1 141 (3.8%)	1 257 (3.9%)	2 315 (3.9%)	1 562 (4.1%)	1 827 (4.3%)	2 131 (4.1%)	1 816 (4.2%)
Limpopo	55 (0.2%)	165 (0.5%)	202 (0.5%)	142 (0.5%)	188 (0.6%)	325 (0.5%)	225 (0.6%)	299 (0.7%)	322 (0.6%)	240 (0.6%)
Mpumalanga	341 (1.4%)	552 (1.7%)	763 (1.8%)	558 (1.9%)	608 (1.9%)	1 209 (2.0%)	740 (1.9%)	831 (2.0%)	994 (1.9%)	875 (2.0%)
North-West	320 (1.4%)	563 (1.7%)	763 (1.8%)	500 (1.7%)	549 (1.7%)	1 276 (2.1%)	782 (2.0%)	847 (2.0%)	1 081 (2.1%)	885 (2.1%)
Free State	511 (2.2%)	636 (2.0%)	828 (1.9%)	525 (1.7%)	651 (2.0%)	1 261 (2.1%)	841 (2.2%)	898 (2.1%)	1 122 (2.2%)	978 (2.3%)
Northern Cape	57 (0.2%)	88 (0.3%)	103 (0.2%)	80 (0.3%)	87 (0.3%)	242 (0.4%)	111 (0.3%)	175 (0.4%)	208 (0.4%)	168 (0.4%)

Table 3.3: Composite patient experience scores, 2010-2019

	Year									
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
No. of responses	23 570	32 744	42 599	30 084	32 154	59 368	38 307	42 519	51 543	42 801
Mean Composite score	56.35%	56.61%	56.77%	56.06%	58.04%	60.63%	59.28%	62.69%	62.76%	63.56%
Mean composite scores by hospital group										
A	55.29%	56.00%	56.08%	55.20%	57.01%	59.36%	58.98%	63.63%	63.08%	64.10%
B	58.94%	58.80%	58.33%	59.19%	60.60%	63.25%	61.33%	63.08%	63.46%	64.61%
C	57.73%	56.38%	58.85%	58.00%	62.15%	65.38%	63.54%	66.58%	67.53%	67.69%
D	55.26%	55.45%	55.68%	53.95%	55.48%	57.59%	56.17%	59.91%	59.91%	60.20%
Mean composite scores by hospital size										
Small (0-94 beds)	61.33%	58.56%	58.85%	58.67%	61.89%	65.00%	62.78%	66.65%	65.82%	67.28%
Medium (95-184 beds)	57.10%	57.70%	57.67%	56.88%	58.99%	61.66%	61.59%	65.08%	64.99%	65.62%
Large (185+ beds)	55.78%	56.02%	56.23%	55.55%	57.35%	59.64%	57.91%	61.24%	61.39%	62.20%
Mean composite scores by hospital province										
Gauteng	54.09%	54.65%	54.82%	53.82%	55.84%	58.77%	57.38%	61.12%	61.06%	61.91%
Kwa-Zulu-Natal	56.45%	55.85%	57.50%	56.07%	58.56%	60.85%	59.63%	64.37%	64.68%	64.37%
Western Cape	61.41%	61.41%	60.97%	60.92%	62.23%	64.21%	62.59%	64.66%	64.79%	66.01%
Eastern Cape	57.28%	59.40%	58.57%	57.49%	59.13%	59.48%	58.90%	62.90%	62.69%	64.43%
Limpopo	52.03%	49.91%	52.13%	51.16%	52.73%	54.09%	52.80%	57.51%	60.75%	61.46%
Mpumalanga	50.79%	53.83%	52.11%	55.03%	56.17%	61.20%	61.85%	62.29%	62.52%	61.81%
North-West	52.60%	54.60%	53.85%	57.07%	56.32%	61.49%	59.79%	63.96%	63.15%	66.96%
Free State	59.11%	57.78%	58.40%	58.74%	61.39%	63.32%	62.66%	64.37%	64.71%	64.09%
Northern Cape	51.78%	51.83%	56.83%	48.70%	56.87%	60.22%	60.86%	63.74%	61.70%	68.06%

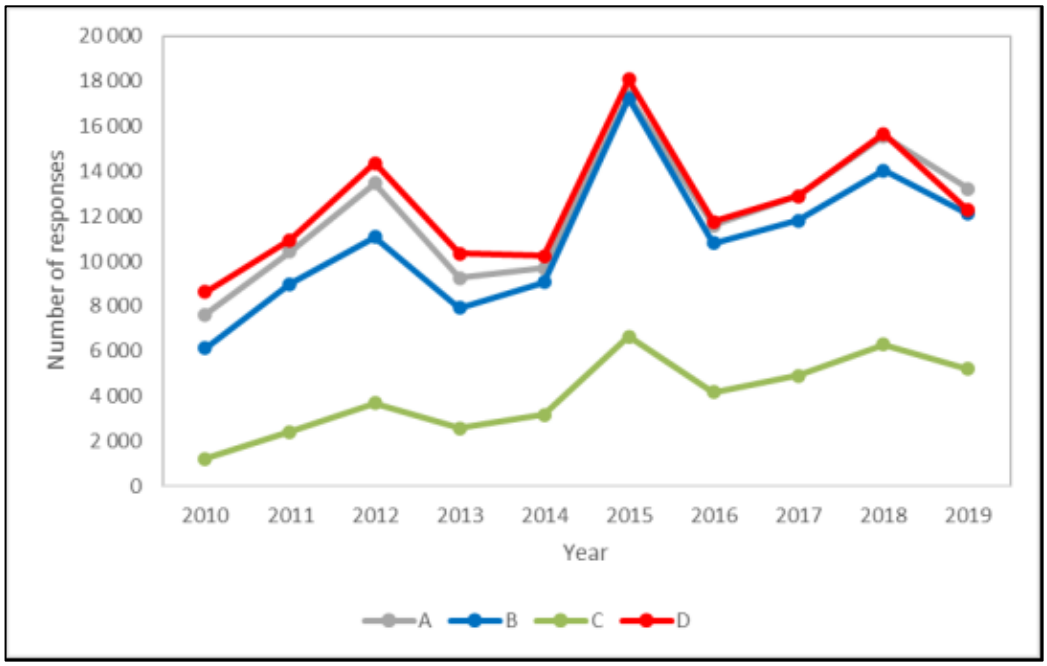


Figure 3.1: Number of HCAHPS-inspired survey responses by hospital group, over time

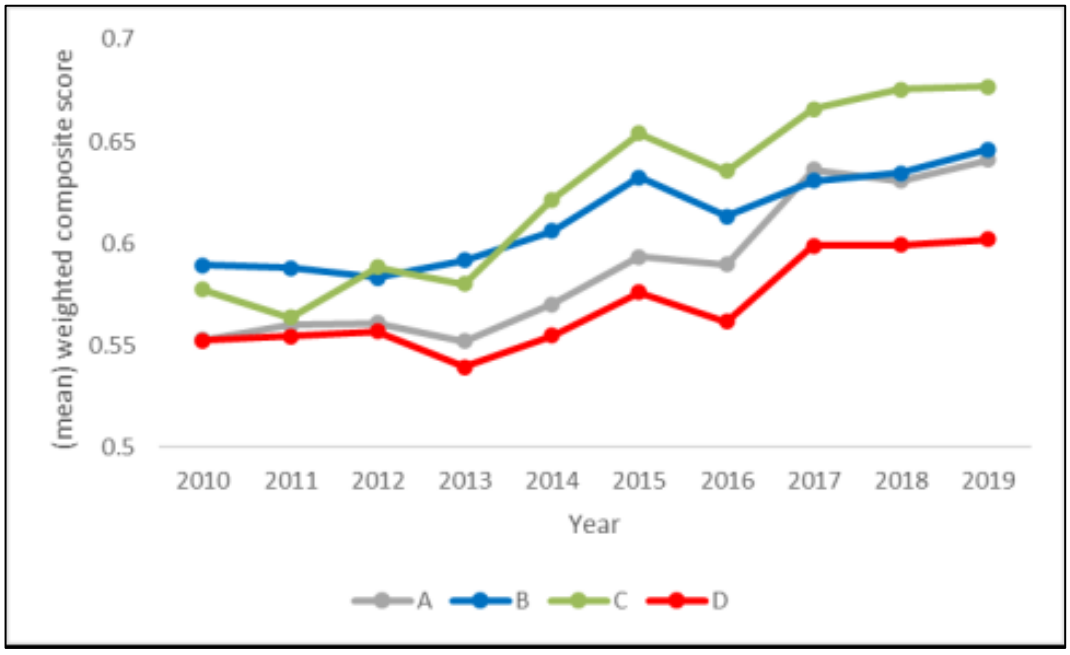


Figure 3.2: Distribution of composite score by hospital group, over time

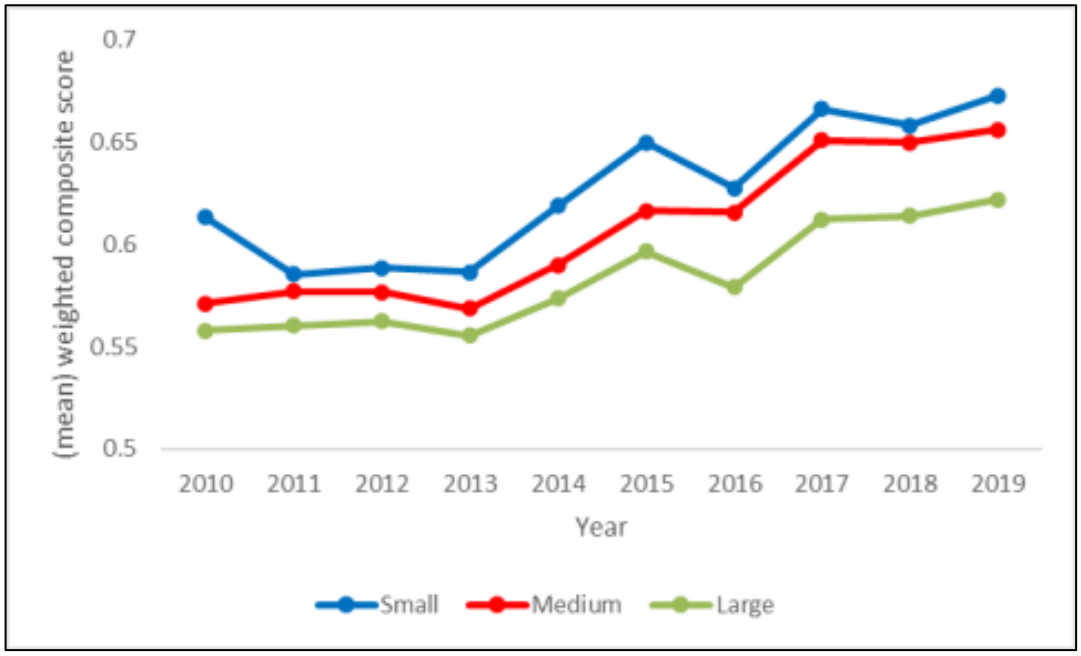


Figure 3.3: Distribution of composite score by hospital size, over time

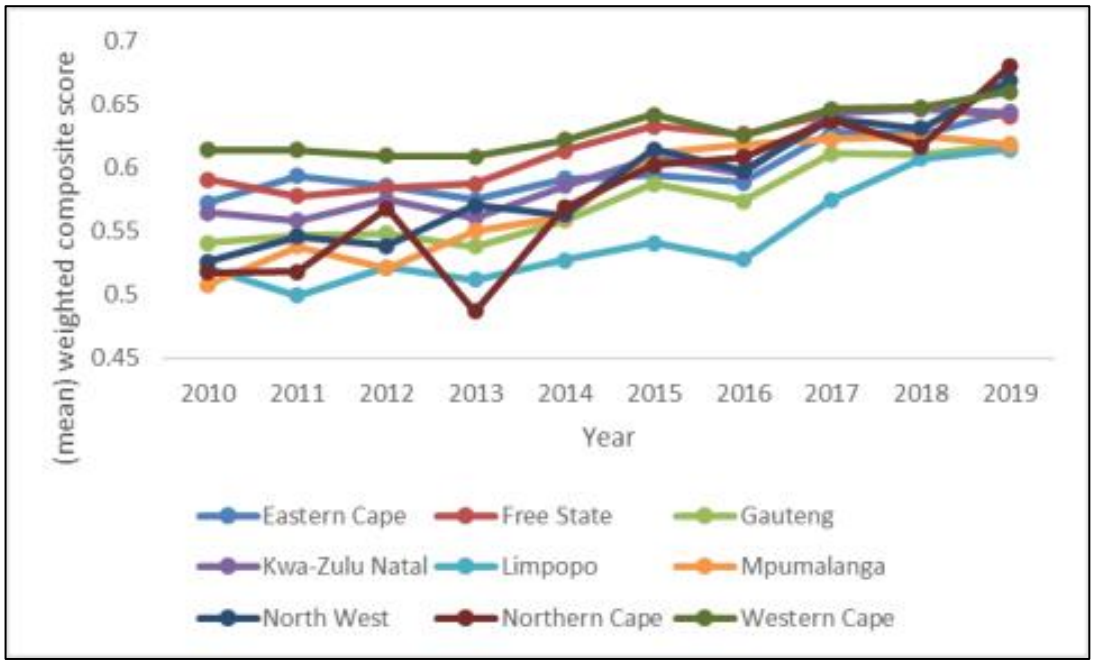


Figure 3.4: Distribution of composite score by hospital province, over time

3.2. Objective Two: To assess impact of PR

Table 3.4 presents the results of the multiple regression analysis to determine whether there was a change in the mean composite patient experience scores before and after the introduction of public reporting. Model 1 adjusts this analysis for hospital group, hospital size and province while Model 2 adds the interaction between hospital group and the period effect. The fit of models 1 and 2 are similar in that almost 50% of the variance in the outcome variable is explained by the chosen predictor variables.

The Model 1 regression results indicate that the intervention had a significant effect on the reporting of patient experiences. Public reporting of patient experiences resulted in a 5 percentage points increase in the composite total score of patient experiences (95%CI: 0.046, 0.055, $p<0.001$).

Patient experience scores also varied by hospital size, hospital group and province. Compared to small-sized hospitals, the composite scores of medium-sized hospitals were 2.5 percentage points (95%CI: -0.033, -0.017, $p<0.001$) lower while large-sized hospitals were 3.9 percentage points (95%CI: -0.047, -0.031, $p<0.001$) lower on average. The mean composite scores for the different hospital group were significantly different. The scores for hospital groups C and B were higher on average, while hospital groups D and A were significantly lower.

The provincial analysis showed that hospitals in the Western Cape, Free State, Eastern Cape and KwaZulu-Natal had significantly higher mean composite scores than the grand mean, while hospitals in Limpopo and the North-West scored significantly lower. The composite score for hospitals in the Western Cape was 3.1 percentage points (95%CI: 0.024, 0.037, $p<0.001$) higher than the overall mean provincial score, while at the other extreme, hospitals in Limpopo scored 5 percentage points lower than the mean score on average.

Table 3.4: Regression of composite (total scores) between hospital group and province against their respective means

	Model 1		**Model 2**	
Factors	**Coefficient (95%CI)**	**p-value**	**Coefficient (95%CI)**	**p-value**
Period (after intervention)	0.050 (0.046, 0.055)	**<0.001*** **	0.067 (0.058, 0.076)	**<0.001*** **
Hospital size				
Small (ref)	ref		ref	
Medium	-0.025 (-0.033, -0.017)	<0.001***	-0.025 9-0.033, -0.017)	<0.001***
Large	-0.039 (-0.047, -0.031)	<0.001***	-0.039 (-0.047, -0.031)	<0.001***
Hospital group				
A vs. mean	-0.014 (-0.018, -0.010)	<0.001***	-0.013 (-0.018, -0.009)	<0.001***
B vs. mean	0.005 (0.001, 0.010)	0.022	0.005 (0.001, 0.010)	0.021
C vs. mean	0.029 (0.024, 0.034)	<0.001***	0.029 (0.023, 0.034)	<0.001***
D vs. mean	-0.020 (-0.025, -0.016)	<0.001***	-0.020 (-0.025, -0.016)	<0.001***
Hospital group## Period				
A#After			ref	
B#After			-0.026 (-0.039, -0.013)	<0.001***
C#After			-0.009 (0.026, 0.006)	0.218
D#After			-0.028 (-0.041, -0.014)	<0.001***
Hospital Province				
EC vs. mean	0.021 (0.010, 0.033)	<0.001***	0.022 (0.010, 0.033)	<0.001***
FS vs. mean	0.028 (0.015, 0.042)	<0.001***	0.028 (0.015, 0.042)	<0.001***
GT vs. mean	-0.006 (-0.011, 0.000)	0.064	-0.006 (-0.011, 0.000)	0.058
KZN vs. mean	0.009 (0.002, 0.016)	0.011	0.009 (0.002, 0.016)	0.015
LP vs. mean	-0.050 (-0.069, -0.032)	<0.001***	-0.050 (-0.069, -0.032)	<0.001***
MP vs. mean	-0.007 (-0.019, 0.005)	0.242	-0.007 (-0.019, 0.005)	0.239
NW vs. mean	-0.020 (-0.031, -0.010)	<0.001***	-0.020 (-0.031, -0.010)	<0.001***
NC vs. mean	-0.006 (-0.027, 0.015)	0.571	-0.005 (-0.027, 0.016)	0.617
WC vs. mean	0.031 (0.024, 0.037)	<0.001***	0.031 (0.024, 0.037)	<0.001***
Observations	1 280		1 280	
R-squared	0.450		0.460	
RMSE	0.0443		0.0440	
F	73.85		63.22	
p-value	<0.001***		<0.001***	

***: p<0,05 **: p<0.01 ***:p<0,001**

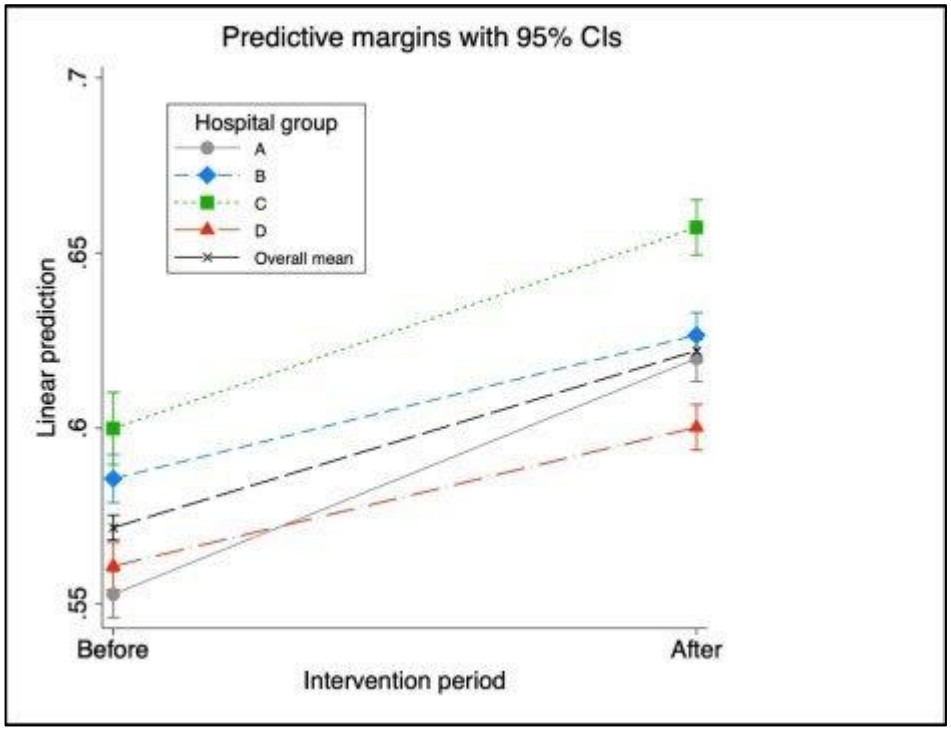


Figure 3.5: Predictive margins of all hospital groups with 95% CI before and after PR period

The addition of the interaction terms in Model 2 did not change the overall pattern of results (Table 3.4). The predictive margins plot from this analysis, to show the impact of public reporting by hospital group, is in Figure 3.3. It confirms the overall positive impact of the intervention as the mean composite scores increase after the intervention for all hospital groups. Hospital group C is also shown to have the highest composite score both before and after the intervention relative to the other hospital groups. Hospital group A started with the lowest average composite scores but also appears to have had the largest improvement following the introduction of public reporting (lines are not parallel). This is confirmed in the Model 2 interaction regression results which show that the difference in composite scores after the intervention were significantly smaller in hospital groups B and D compared to hospital group A, while the increase in hospital group C was comparable to that of hospital group A.

3.3. Objective Three To investigate the effect of PR on the trend of composite scores

The results of the ITS analysis of the impact the introduction of public reporting in 2015 on composite (total) scores from the hospital patient experience survey is shown in Table 3.5 in the composite (total) score column, with Figure 3.6 providing an illustration

of the ITS results. The analysis was done for all hospitals combined to increase statistical power.

The ITS analysis indicates that the composite score had a small positive trend prior to the introduction of public reporting in 2015 although this was not statistically significant. However, there was an immediate and significant increase in the mean composite score of 2.4 percentage points (95%CI: 0.008, 0.040, p <0.05) when public reporting was introduced. Following the intervention, the mean composite (total) score increased by a statistically significant 1.0 percentage point each year (95%CI: 0.006, 0.152, p = 0.002).

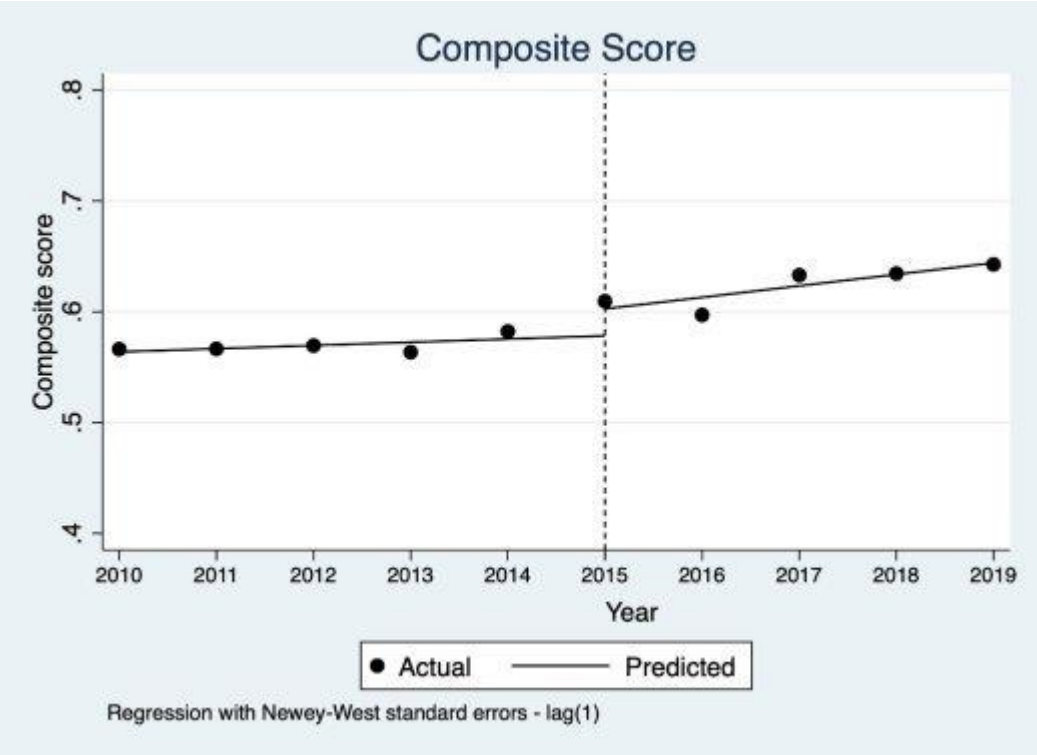


Figure 3.6: Change in mean composite (total) score, due to public reporting intervention (2015), among four private hospital groups in South Africa

Table 3.5: Interrupted time series analysis for impact of public reporting on composite total and sub-categories

Measure	Composite score Coefficient (95% CI)	Treatment from nurses Coefficient (95% CI)	Staff responsiveness Coefficient (95% CI)	Treatment from doctors Coefficient (95% CI)	Hospital environment Coefficient (95% CI)	Pain management Coefficient (95% CI)	Medication information Coefficient (95% CI)	Discharge information Coefficient (95% CI)	Overall hospital rating Coefficient (95% CI)
Starting level	**0.564***** (0.558, 0.570)	**0.637***** (0.629, 0.644)	**0.645***** (0.636, 0.655)	**0.810***** (0.905, 0.815)	**0.582***** (0.577, 0.587)	**0.664***** (0.660, 0.669)	**0.381***** (0.368, 0.395)	**0.388***** (0.361, 0.415)	**0.413***** (0.403, 0.423)
Slope pre-intervention	0.003 (-0.001, 0.007)	0.002 (-0.002 ,0.007)	0.003 (-0.002, 0.007)	**0.005**** (0.002, 0.007)	**-0.002**** (-0.004,0.001)	**0.007**** (0.004, 0.010)	0.004 (-0.003, 0.107)	0.003 (-0.007, 0.131)	0.002 (-0.005, 0.009)
Immediate change in score in 2015	**0.024*** (0.008, 0.040)	**0.039**** (0.021, 0.058)	0.013 (0.004,0.312)	**0.014**** (0.005, 0.023)	-0.003 (-0.026,0.012)	0.130 (-0.007, 0.027)	**0.046**** (0.020, 0.726)	0.351 (-0.002, 0.723)	**0.045*** (0.143,0.075)
Slope post-intervention	**0.010**** (0.006, 0.152)	**0.012***** (0.007, 0.016)	0.005 (-0.001, 0.010)	**0.005**** (0.003, 0.007)	**0.007**** (0.000, 0.144)	**0.008**** (0.004, 0.129)	**0.143**** (0.009, 0.196)	**0.013**** (0.007, 0.018)	**0.023***** (0.016, 0.031)
Change in the slope	0.007 (-0.000, 0.015)	**0.010*** (0.002, 0.017)	0.002 (-0.006, 0.100)	0.000 (-0.004, 0.004)	**0.010*** (0.003, 0.167)	0.002 (-0.004, 0.008)	**0.105*** (0.001, 0.204)	0.009 (-0.001, 0.193)	**0.021**** (0.009, 0.033)

Statistically significant coefficients shown in bold. *: p<0,05 **: p<0.01 ***:p<0,001

3.4. Objective Four: To analyse how PR influenced certain sub-categories

To investigate the contribution of different patient experience sub-categories to the changes in the composite score in the HCAHPS-inspired survey, we first repeated the ITS analysis of the impact of public reporting on each sub-sub-category and then decomposed the sources of variation post-intervention to identify which sub-categories most influenced the changes in mean composite (total) score.

3.4.1 Integrated time-series analysis of sub-categories

The ITS regression results for each sub-category are also shown under the corresponding column in Table 3.5 and plotted in Figure 3.7. Prior to public reporting, between the period of 2010-2014, there was already a trend of improvement in the sub-categories relating to treatment from doctors and pain management. Scores around the hospital environment showed a decreasing trend pre-PR. The introduction of PR in 2015, resulted in immediate and significant improvements in the treatment from nurses which displayed an immediate rise of 3.9% (95%CI: 0.021, 0.058, $p < 0.01$), hospital environment (by reversing the negative trend as seen in Figure 3.7), medication information with an immediate rise of 4.6% (95%CI: 0.203, 0.726, $p < 0.01$), and overall hospital ratings with a 4.5% increase (95%CI: 0.143, 0.075, $p < 0.05$).

Post-public reporting trends, between the period of 2016-2019, showed positive slopes in almost all categories (Figure 3.7), except for staff responsiveness. Significant changes were particularly notable in the treatment from nurses sub-category, with an ongoing annual increase of 1.2% (95%CI: 0.007, 0.016, $p < 0.01$), treatment from doctors showed a continued annual growth of 0.5% (95%CI: 0.002, 0.007, $p < 0.01$), information about medication increased by an impressive 14.3% (95%CI: 0.009, 0.196, $p < 0.01$) annually, and overall hospital ratings displayed an annual rise of 2.3% (95%CI: 0.016, 0.031, $p < 0.001$). The data suggests that public reporting has had a broadly positive impact on patient experiences across various aspects of hospital care in South Africa.

3.4.2 Shorrock's decomposition analysis of sub-categories

The composite patients' experience score is the sum of the other sub-components. Shorrock's decomposition analysis, conducted on the combined dataset

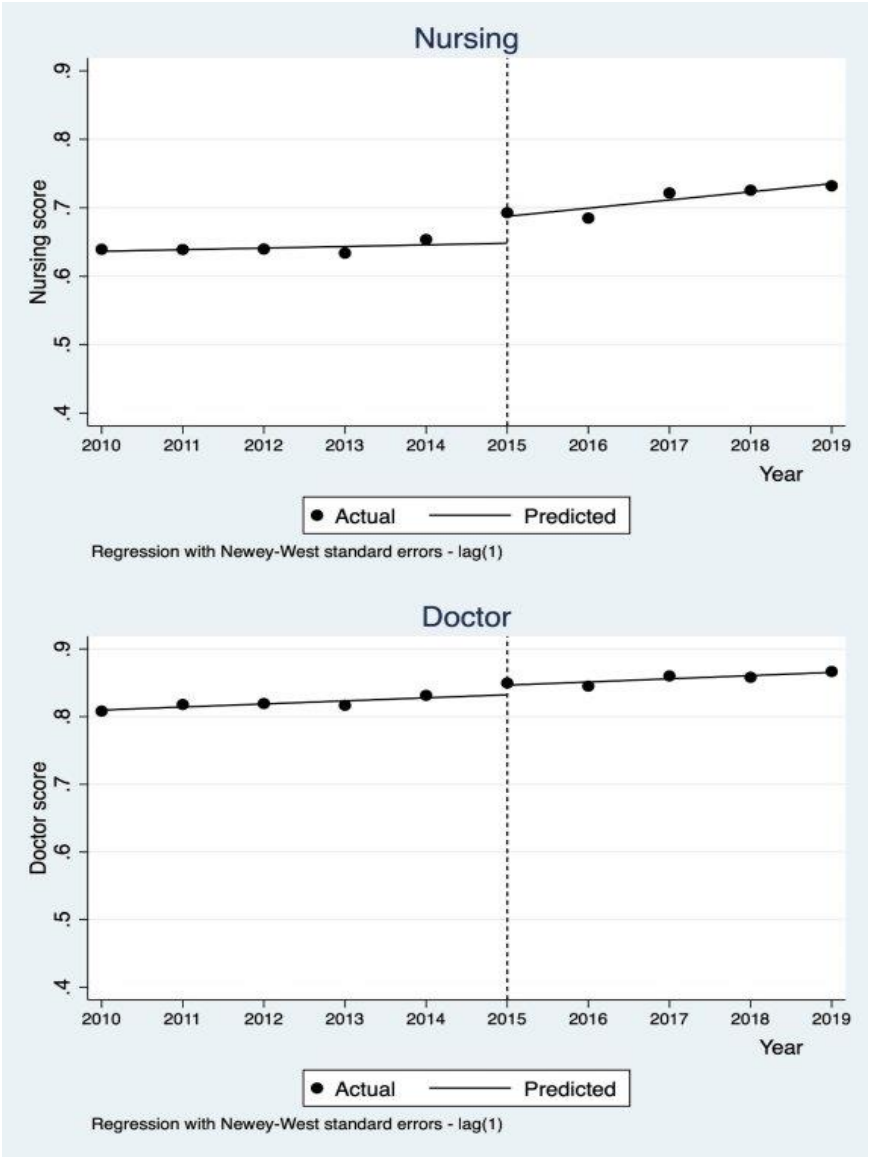
encompassing both pre and post-public reporting periods, evaluates which sub-component is most responsible for the variation in the total experience scores. These results are ranked in Table 3.6 is order of decreasing variance.

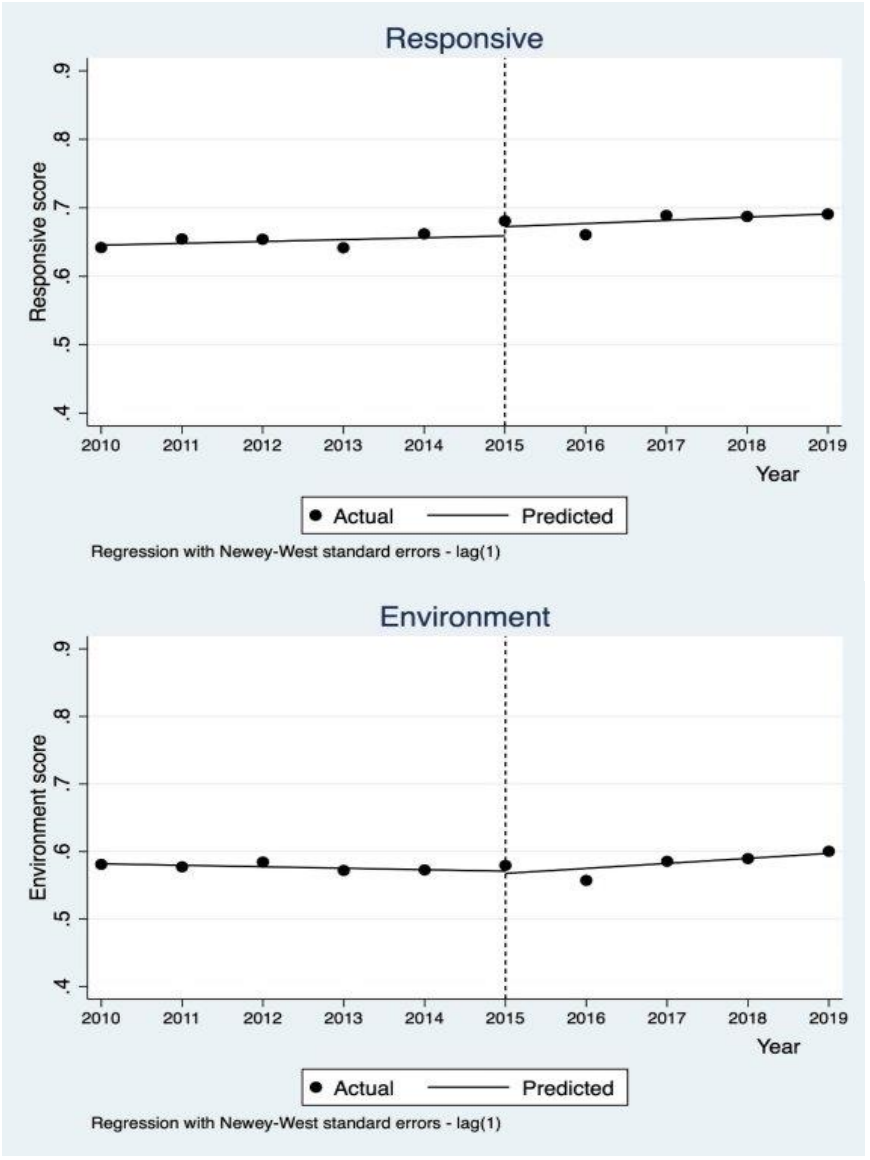
The analysis reveals that the nurses' sub-category accounts for 18% of the total variation in patient experience scores. This high percentage suggests that nursing care significantly contributes to variation in overall patient perception. Similarly, the medication information and staff responsiveness sub-categories are also major contributors to this variance, with 18% and 16% respectively. On the other end of the spectrum, the treatment from doctors' sub-category demonstrates the lowest variance at 7%, indicating a more consistent satisfaction level with this aspect of patient care across the hospitals and over time.

These findings suggest that while some areas of patient experience, like nursing care and medication information, show substantial variability, others, such as doctor treatment, are more consistently rated. The use of the total dataset, including data from both before and after the introduction of public reporting in 2015, indicates that these variances are reflective of the overall patient experience across the period. This analysis helps identify which aspects of patient care might need more focused attention and improvement, especially in the context of the changes brought about by public reporting. Understanding the sources of this variance is crucial for hospitals aiming to enhance patient satisfaction and care quality consistently over time.

Table 3.6: Shorrock's decomposition for categories in HCAHPS-inspired survey, 2010-2019

Measure	Variance
Medication information	18.12
Treatment from nurses	18.02
Staff responsiveness	16.16
Discharge information	14.59
Pain management	14.33
Hospital environment	11.29
Treatment from doctors	7.48


Nursing
Nursing score
.4
.5
.6
.7
.8
.9
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year
Actual
Predicted
Regression with Newey-West standard errors - lag(1)


Responsive
Responsive score
.4
.5
.6
.7
.8
.9
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year
Actual
Predicted
Regression with Newey-West standard errors - lag(1)

Doctor
Doctor score
.4
.5
.6
.7
.8
.9
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year
Actual
Predicted
Regression with Newey-West standard errors - lag(1)

Environment
Environment score
.4
.5
.6
.7
.8
.9
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year
Actual
Predicted
Regression with Newey-West standard errors - lag(1)

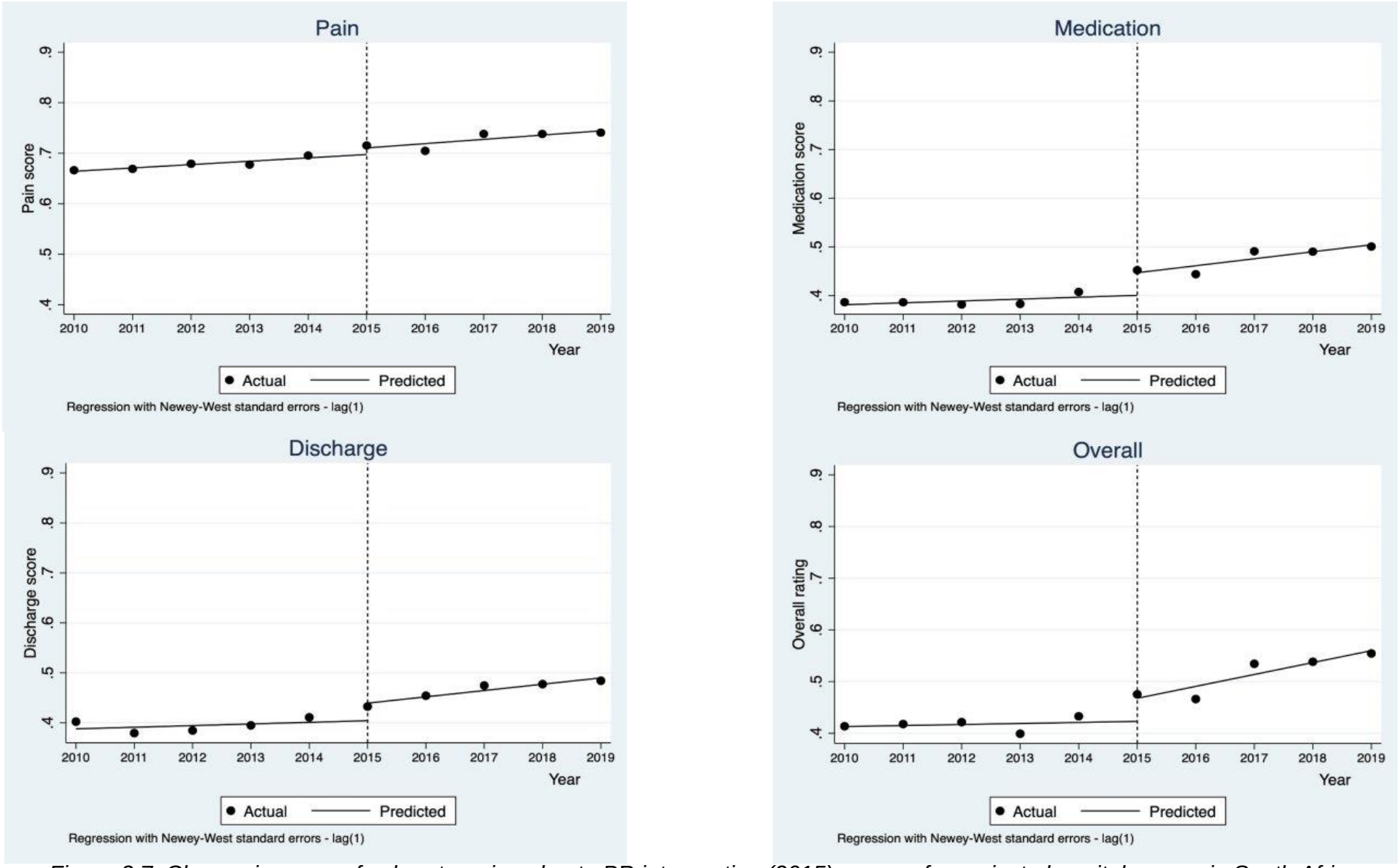


Figure 3.7: Change in mean of sub-categories, due to PR intervention (2015), among four private hospital groups in South Africa

4. Chapter 4: Discussion & Recommendations:

The primary objective of this study was to investigate whether public reporting of patient experience scores impact quality of care among private hospitals in South Africa. This chapter will summarise the study results, outline the strengths and limitations of the study, and discuss the key findings in relation to existing literature. The implications for health policy in South Africa will then be discussed before concluding with recommendations for future research.

4.1 Summary of Results

The results show that the highest number of responses were obtained in 2015 which was the year that public reporting had been introduced. There had been a generally consistent distribution in survey responses obtained for each of the four hospital groups during the period under consideration. The distribution of survey responses is proportional to hospital size but not always proportional to the size of the population in each province.

The mean weighted composite score for all hospital groups, all hospital sizes and most hospital provinces has followed a similar trend over time. Hospital group D was shown to have the lowest score at each point in time whereas hospital group C was shown to have the highest score for many of the years.

Variations in patient experience scores were observed across different hospital groups, sizes, and provinces. Hospital groups C and B had higher average composite scores while hospital groups A and D had lower average composite scores. When compared to small sized hospitals, medium sized and large hospitals both had lower average composite scores. Hospitals in the Western Cape, Free State, Eastern Cape, and KwaZulu-Natal outperformed their respective mean composite score, whereas those in Limpopo and the North West fell significantly below the average.

The ITS analysis indicated a minor, yet not statistically significant, upward trend in the composite score prior to the introduction of public reporting in 2015. The implementation of public reporting marked a significant and immediate increase in the average composite score. The mean composite score then displayed a steady and statistically significant rise each year post the onset of public reporting.

The ITS analysis indicated that prior to the onset of public reporting, there was an observable upward trend in patient experience sub-categories related to doctors' treatment and pain management, whereas the hospital environment sub-sub-category had been declining. The onset of public reporting in 2015 led to significant improvements in most of the sub-categories. After the onset of public reporting of patient experience scores, the mean scores for each of the sub-categories increased annually by a statistically significant rate except for the staff responsiveness sub-category.

Shorrock's decomposition analysis showed that treatment from nurses and medication information sub-categories had the highest variances (18%). This indicates that there are more inconsistencies in how members rate these sub-categories over other sub-categories in the HCAHPS-inspired survey. Treatment from doctors contained the lowest variance (7%) of all sub-categories.

4.2 Strengths and limitations

A key strength of this study is that it is the first attempt to investigate the impact of PR in South Africa's private hospitals. Using a unique dataset that compares performance across South Africa's four leading hospital groups, this research fills a critical gap highlighted by the Health Market Inquiry (HMI) (27). The HMI noted collusion and competition limitations due to information imbalances, the absence of value-based contracts, limited regulation, and market concentration. The uniqueness of the dataset enables insights into patient experiences across these hospital groups, maintaining consistency over time and revealing an overall positive but small impact of public reporting.

The primary data is robust. Risk adjustments were applied to factors such as self-rated health, language, education status, gender, age, survey response lag, and admission type (medical/surgical) for enhanced comparability. The dataset also had substantial sample sizes for each hospital group, a crucial element for discerning genuine differences from variations relating to chance. In this study, only hospitals with at least 50 completed surveys were included.

In addition, the various analysis undertaken speaks to the robustness of the results. By employing the regression together with ITS, the study reinforces the reliability and credibility of its conclusions. As this study used data from collected from Life

Healthcare, Netcare, National Hospital Network and Mediclinic, this study is generalizable for the South African, privately insured population. This confirms the external validity of the study results.

A limitation of this research is that the study design used is observational rather than a randomised controlled trial (RCT), and there is no control group without public reporting for comparison. The consequence of this is that we are unable to ascertain whether the intervention of public reporting is solely responsible for the improvement in patient experience scores, as there could just be a movement within the industry towards improving quality of care. An observational study design was necessary in this scenario, as randomisation of the exposure or intervention was not possible. This was because the intervention was enforced by the medical aid administrator across all hospital groups.

A limitation of the primary data is the low survey response rate, of approximately 25%. A sub-optimal response rate could introduce bias, as participants may have distinctive experiences motivating their survey participation, known as response bias (74). However, surveys employing robust methodologies, like the HCAHPS survey, show a weak association between response rates and non-response bias (9,74,75). Furthermore, the response rates in this study align with those in other similar research, falling within the acceptable range of 20-40% annually for monitoring and evaluation purposes (9,57,75). Finally, it is likely that the response bias is constant over time so would not significantly influence this primarily longitudinal analysis.

A final study limitation in that only patient experience data was analysed. Although we did have access to some mortality data for each hospital group, it was unfortunately incomplete and not available by year. The limited number of mortality data points and difficulty in comparing mortality rates before and after the introduction of public reporting made it unsuitable for meaningful statistical analysis within the scope of this study.

4.3 Discussion of Key Findings

4.3.1. Descriptive hospital characteristics that impact patient experience scores

The findings of this study suggest that Hospital Group C and hospitals in the Western Cape have the highest patient experience scores, while Hospital Group D and

hospitals in Limpopo have the lowest scores. Higher patient experience scores in the context of this study indicate better hospital performance. Hospital Group A, B and D share similar characteristics in terms of structure, provincial distribution of hospitals and management. While Hospital Group C is a membership-based organisation, with hospitals not having a top-down leadership style.

According to Statistics SA, the Western Cape has the second highest number of privately insured members, more private hospitals and subsequently more competition compared to Limpopo, which has the lowest (73,79,80). This could explain the higher scores in the Western Cape, compared to the low patient experience scores in Limpopo. Gauteng has the highest number of private hospitals however the patient experience scores are lower than the Western Cape in each year during the period of study. This may be due to Gauteng facing higher patient volumes as they cater to the largest amount of privately insured members relative to all other provinces. This could potentially lead to higher occupancies overcrowding at hospitals thus impairing patient experience scores. As noted earlier, higher response rates may capture a broader range of experiences beyond just the most dissatisfied, resulting in higher average scores. Staffing levels and resource distribution may also cater to volumes, leaving rural areas like Limpopo, with lower staffing and resources relative to hospitals in urban areas (76).

The analysis of hospital groups and provinces provides valuable insights into variations in patient experience across different healthcare settings and regions. The study's findings could be used to target improvement efforts by hospital groups in specific provinces to enhance patient satisfaction and quality of care.

4.3.2. More complex understanding of trends in pre-intervention patient experience scores

The pre-intervention period in all Interrupted Time Series (ITS) graphs, except for hospital environment, exhibits a slightly positive trend, indicating that there was a small increase in patient experience scores over time before the introduction of public reporting (PR). This observed trend aligns with findings from a study assessing the overall rating of patient experience across 3425 hospitals from 2008 to 2014, revealing a moderate improvement of 6.1% over this period (81).

This positive trend may stem from intrinsic initiatives that have had an impact on sub-categories assessed by the HCAHPS survey and improved patient's perception of care. Prior to the intervention, the medical aid administrator shared information on patient experience scores to private hospital groups. This could act as an inherent incentive potentially contributing to enhancements, as described by the intrinsic change pathway discussed in the introduction of this report. This marginal improvement in scores pre-intervention, might also be attributed to inventive practices within hospital groups or spurred by competition between these entities, fostering advancements in healthcare systems and processes that subsequently influence how patients perceive their experiences.

This act of sharing information is an incentive in and of itself that may have led to improvement as highlighted by the intrinsic change pathway discussed in chapter one. This improvement could also be due to innovation within hospital groups, or competition between hospital groups which foster advancements in healthcare systems and processes that subsequently impact patients' perceptions of their experience.

The success of hospital interventions in improving patient experience scores has been well-documented. Initiatives such as increased frequency of doctor ward rounds or providing real-time feedback to providers on their HCAHPS-related domain scores, even without public reporting, have proven successful in increasing the "communication with doctor subdomain" over time (82,83).

While this finding offers reassurance that private hospital groups in South Africa have shown a conservatively positive trend in patient experience scores even before PR, there has been a greater improvement in scores post-intervention.

4.3.3. PR has an impact on patient experience scores in South Africa (SA) that is similar to international trends

The rise in composite scores after the introduction of PR in all private hospitals in South Africa confirms PR's impact on patient experience scores. The ITS graphs show the difference in scores before and after PR, including immediate and post-trend effects. Before PR, scores were marginally increasing, but the PR intervention in 2015 led to an immediate increase in scores, as shown in the ITS graphs.

A reason for the immediate increase in scores post-public reporting may be due to these areas being the initial focus areas for hospital groups (84,85). As mentioned earlier, the medical aid administrator, began discussions with the hospital groups a year prior to intervention. This gave the hospitals enough time to focus on improving patient experience.

A few studies in the US attributed this initial increase to hospital groups' focusing on encouraging patients to complete the HCAHPS-survey, thereby increasing response rates and the probability of higher scores (4,57,84). In this study, there was an increase in responses in 2015, the year PR was introduced which could've been the reason for the initial improvement among all scores in South African private hospitals. The medical aid administrator made hospitals aware of their intent to publish these scores in 2014. Due to the competitive nature of the leading hospital groups in the country and the reputational prestige of being publicly known as a high-quality provider to the public, they may have had an initial focus on increasing response rates at the time of the intervention.

The trend post-intervention observed from ITS graphs are relatively consistent over time. It is challenging to determine whether this result is purely because of the intervention of PR or because of other factors discussed above. Findings in healthcare research often face obstacles when trying to determine the exact effect of a single intervention. Geerligs et al. (86) attributed sustainability of quality interventions to either improvements in systems, staff, or interventions (87). Various factors such as hospital initiatives, competition, and information sharing, making it difficult to attribute the observed trend only to public reporting (PR).

From Figure 3.5 comparing total composite score to the average, all hospitals have shown consistent increase in scores due to the intervention, suggesting that PR promoted competition on quality. This substantiates the intrinsic-change pathway discussed in the introduction which states that PR acts as a driver for improvement in performance.

4.3.4. Main determinants of patient experience

The Shorrock's decomposition analysis was used to quantify which sub-categories are associated with having the greatest impact on the composite (total) score by quantifying the contributions to variation. This helps to gain insight into sub-categories

of the HCAHPS-inspired survey that have had the most consistent experiences as rated by patients, helping highlight areas for hospitals to improve. The variability in composite (total) patient experience scores was delineated by sub-category, where ‘treatment from doctors’ led to the least variability at 7%, while ‘treatment from nurses’ and ‘information about medication’ had the highest variability, both at 18% each when determining the composite (total) score.

The low variability in ‘treatment from doctors’ subcategory across different facilities reflect that patients tend to have relatively consistent experiences with their doctors. This is supported by similar studies conducted in Europe, the US, UK and even rural China, which speaks to the robustness of this study findings (8,88–90). This sub-category of the HCAHPS-inspired survey is one that hospital groups in SA have little control over. This is because In the South African private sector, the relationship of patients with doctors is independent of their relationship with hospitals as doctors are not employed by the hospitals.

Since patient experience is largely determined by putting the patient at the centre of care, it is no surprise that effective communication is critical to a patient’s perception of their experience. It could be argued that doctors spend more time with patients over the period of their hospital admission, building a relationship with them, contributing to positive experiences and ratings. Studies from the US and Japan confirm that length of time spent on ward rounds, and taking the time to explain to the patient what the plan of action for their health is, results in positive patient experiences (89,91). This is confirmed by a recent study showing that doctors in their residency obtained higher scores in the ‘treatment from doctors’ category compared to experienced doctors due to the time and attention they gave their patients (92). Extensive research has found a positive correlation between high ‘treatment from doctors’ scores and improvements of nurse satisfaction, patient experience and even reduced mortality and readmission rates (42,89,91,93–95). This connection could be due to collaborative and effective teamwork between doctors and nurses, which contributes to a positive working environment. It suggests that investing in improving the quality of interactions and treatment provided by doctors can have spillover effects on multiple aspects of healthcare, including staff satisfaction, patient experiences, and health outcomes. It is encouraging to see that these results correlate with international experience.

Similarly, in other studies ‘treatment from nurses’ sub-category was found to correlate to high patient experience scores as well as contribution to reduced readmission rates (42,89,91,93–95). This is because nurses are the main point of care for in-hospital patients, caring for them on a personal level (88,96). Interestingly these studies found staffing patterns impacted an increase in this domain of patient experience with higher staffing rates and greater skill-mix associated with higher scores (88,90,94,96). This could be why our results differed, showing highest variability across hospitals in this category.

South Africa is currently facing a critical shortage of skilled nurses, with nurses being overworked, under-remunerated and under-resourced in both public and private settings across the country (97). The reason for the shortage of nurses may be attributed to a shortage of nursing schools, healthcare funding due to the recession and immigration of qualified nurses due to undesirable working conditions and remuneration and an aging population resulting in more retired nurses (97,98). Studies found that nurses neglected or ignored patients simply because of their workload (97,98).

‘Information about medication’ sub-category also showed a high variability in this study. Nurses are responsible for this domain of care in an in-hospital setting, as patients do not go to the pharmacy to be counselled on new medication. Nurses also could reduce medication errors, but with the current shortage, the probability of medication errors are more frequent (89,92) Being adequately informed about their medication, reduces a patient’s risk of readmission, and increases their discharge experience scores (42,92). Results around this domain were consistent with other studies showing that there is room for improvement in this area (42).

This research highlights the intricate interplay of factors impacting patient experience scores. Enhancing the quality of interactions and treatment by physicians can exert profound effects on diverse facets of healthcare, aligning with international experiences. Resolving issues related to nurse staffing and implementing thorough patient education on medication emerge as essential measures to elevate patient experiences and improve overall healthcare outcomes in South African private hospitals.

4.4 Public reporting and health policy in South Africa

The Health Market Inquiry (HMI) highlighted that the public lacks access to information for selecting practitioners and facilities based on their performance results, which hampers the ability of patients to assess the appropriateness of treatments and compare the quality of providers contracted by funders (27). Even though there is a need for PR in South Africa, there are currently no defined policies or regulations around PR on quality measures in South Africa.

This gap highlights the importance of establishing a framework that ensures transparency, accountability, and standardised reporting practices in both the public and private healthcare sector which was also highlighted by the HMI. Such regulations would not only empower patients with meaningful information but also contribute to fostering a competitive and quality-driven healthcare landscape in South Africa which is the aim of the National Health Insurance (NHI).

Implementing a policy on Public Reporting (PR) of quality measures in South Africa could encounter challenges, notably the absence of consensus on the metrics that should be measured. This includes considering Patient-Reported Outcome Measures (PROMs) and Patient-Reported Experience Measures (PREMs) in conjunction with other relevant measures such as readmission and mortality rates. There needs to be alignment across the industry on methodology to be used and establishing and adhering to standardised coding practices is essential across all providers, and there should be consensus on case mix adjustment mechanisms. Previously, a medical aid administrator's model to measure and report on mortality data has been criticised due to lack of consensus from hospital groups on the methodology used in this calculation (17,99). The appropriateness of a medical scheme administrator to publicly report on hospital's performance should be interrogated as this could be seen to have self-serving implications.

Public Reporting (PR) serves a different purpose than internal reporting systems like Healthcare Quality Assessment (HQA) (100). The HQA evaluates healthcare quality in medical schemes annually to help decision-makers, including trustees, management, providers, and policymakers, improve the care given to members. PR on the other hand, is vital in providing a broader and more transparent view of healthcare performance. While internal reporting is essential for quality improvement within

organisations, PR extends the scope to a wider audience, including patients, funders, and the public. This external scrutiny encourages providers to prioritise not only internal improvements but also align their practices with broader quality standards due to reputational damage.

Reputational damage acts as a deterrent for organisations considering PR participation. The dynamics of PR, whether voluntary or mandatory, shape the healthcare landscape, with voluntary reporting potentially fostering transparency and accountability. Compulsory reporting ensures a standardised approach but introduces the risks such as prioritising prestige over genuine patient care improvements (99). Crafting a robust PR framework in South Africa necessitates navigating these complexities to ensure authentic quality enhancements and uphold the integrity of healthcare data.

Additionally, it can be argued that privately insured individuals in SA, while seemingly having a choice in selecting providers, may face limitations within provider networks, potentially restricting access to high-quality providers due to out-of-network co-payments. Consumer choice is not universally achievable, particularly in rural areas where limited healthcare provider concentration may impact access to quality care, contingent upon a consumer's willingness and ability to invest in direct and indirect costs, such as travel expenses and work absenteeism (22). This aspect emphasises the need for a nuanced approach to understanding healthcare access, competition, and choice across different demographics in South Africa.

4.5 Future Research

A potential area for further investigation involves examining the trajectory of patient experience trends post-public reporting over an extended period. A separate study, which analysed eight years of PR patient experience data, identified a "ceiling effect", indicating that, at a certain stage, observing marginal improvements in experience scores becomes more challenging (81). It is valuable to explore whether this observed phenomenon is consistent in the current study by assessing trends over an extended timeframe, and subsequently, delving into the underlying reasons for this potential plateau.

Another area of future research involves assessing the impact of PR on healthcare disparities in the South African context. The potential mechanism or link between PR

and healthcare disparities in South Africa could be rooted in how information transparency influences decision-making, resource allocation, and policy formulation. Publicly reported healthcare data may shed light on existing disparities in service quality, access, and outcomes. Given the distinctive healthcare landscape of South Africa, characterised by unique social, economic, and cultural factors differing from the United States, it is crucial to explore how PR affects healthcare disparities. Variations in the South African healthcare system, encompassing aspects such as service accessibility, infrastructure, and socio-economic conditions, may require a customised approach to account for determinants of health.

5. Chapter 5: Conclusion

This research has systematically examined the impact of the introduction of Public Reporting (PR) on patient experience scores in four prominent private hospital groups in South Africa. The aim was to delineate the impact of PR on patient experiences while concurrently investigating the influence of hospital characteristics on this relationship. Moreover, the study sought to discern specific sub-categories of scores that exerted a discernible effect on the overarching patient experience score.

The empirical findings showed that patient experience scores improved slightly pre-intervention, although the trend was not statistically significant. Through robust statistical analysis, it has been shown that PR improved patient experience scores in all four private hospital groups. Notably, the category of "treatment from doctors" played an important role in the consistency of positive patient experiences, while "information about medication" and "treatment from nurses" added significant variability to the overall score.

This study is the first of its kind in South Africa, suggesting the potential of PR in accordance with the HMI recommendations, especially in the landscape of private healthcare. PR can empower consumers by helping them choose high-quality healthcare providers through the dissemination of relevant information. By fostering a competitive environment based on quality, PR places patients at the centre of a healthcare system that values excellence and competition.

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Appendix A: Plagiarism Declaration

University of the Witwatersrand, Johannesburg

School of Public Health

SENATE PLAGIARISM POLICY

Declaration by Students

I Nabeela Cassim (Student number: 448896) am a student registered for MPH Health Economics in the year 2024

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that ALL the work submitted for assessment for the above course is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.

Signature: Nabeela Cassim Date: 29 February 2024

Appendix B: Ethics Waiver Declaration

R49 Ms N Cassim

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
CLEARANCE CERTIFICATE NO. M2211123

NAME: (Principal Investigator)	Ms N Cassim
DEPARTMENT:	School of Public Health Medical School University
PROJECT TITLE:	*The impact of public reporting of patient experience scores on quality of care in South African private hospitals, 2010-2019: an observational study*
DATE CONSIDERED:	Ad hoc
DECISION:	Approved unconditionally
CONDITIONS:	
NOTE:	If contact information regarding student study participants is required please contact the Registrar's office - <Nicoleen.Potgieter@wits.ac.za>
SUPERVISOR:	Dr D Blaauw
APPROVED BY:	Dr CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	2022/12/21

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
OFFICE OF THE DEPUTY VICE CHANCELLOR RESEARCH
09 JAN 2023
RESEARCH OFFICE HREC (Medical)

Received: Zarele

This Clearance Certificate is valid for 5 years from the date of approval. An extension may be applied for

DECLARATION OF INVESTIGATORS

To be completed in duplicate and ONE COPY returned to the Research Office secretariat on the 3rd floor Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated from the research protocol as approved, I/we undertake to submit details to the Committee. I agree to submit a yearly progress report. When a funder requires annual re-certification, the application date will be one year after the date when the study was initially reviewed. In this case, the study was initially reviewed in November and therefore reports and re-certification will be due in the month of November each year. Unreported changes to the study may invalidate the clearance given by the HREC (Medical).

Nabeela Cassim — Signature of Principal Investigator

09/01/2023 — Date

Appendix C: Signed Turn-it-in Report

CassimN_MPH Final Report.docx

ORIGINALITY REPORT

5%	5%	2%	%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	wiredspace.wits.ac.za Internet Source	1%
2	bmcpediatr.biomedcentral.com Internet Source	<1%
3	www.hcahps.org Internet Source	<1%
4	www.unicef.org Internet Source	<1%
5	media.proquest.com Internet Source	<1%
6	www.mdpi.com Internet Source	<1%
7	www.health.mil Internet Source	<1%
8	prr.hec.gov.pk Internet Source	<1%
9	docplayer.net Internet Source	<1%

NCassim

Appendix D: HCAHPS-inspired survey used by Medical Aid Administrator

Patient Experience Survey

1. Introduction

Instructions:
1. Click on the button next to your chosen answer
2. Once all answers are completed on a page click on the "next" button.
3. If you feel you would like to change a previous answer on a previous page, click on "Back".
4. Your responses are confidential and there are no questions which ask for any personal health information.

Thank you for taking the time to complete this survey.

2. About Your Care From Nurses

*** 1. During this hospital stay, how often did nurses treat you with courtesy and respect?**

- Never
- Sometimes
- Usually
- Always
- I don't know

*** 2. During this hospital stay, how often did nurses listen carefully to you?**

- Never
- Sometimes
- Usually
- Always
- I don't know

*** 3. During this hospital stay, how often did nurses explain things in a way you could understand?**

- Never
- Sometimes
- Usually
- Always
- I don't know

Patient Experience Survey

*** 4. During this hospital stay, after you pressed the call button, how often did you get help as soon as you wanted it?**

- Never
- Sometimes
- Usually
- Always
- I never pressed the call button

3. About Your Care From Doctors

*** 5. During this hospital stay, how often did doctors treat you with courtesy and respect?**

- Never
- Sometimes
- Usually
- Always
- I don't know

*** 6. During this hospital stay, how often did doctors listen carefully to you?**

- Never
- Sometimes
- Usually
- Always
- I don't know

*** 7. During this hospital stay, how often did doctors explain things in a way you could understand?**

- Never
- Sometimes
- Usually
- Always
- I don't know

Patient Experience Survey

4. About the Hospital Conditions

*** 8. During this hospital stay, how often were your room and bathroom kept clean?**

- Never
- Sometimes
- Usually
- Always
- I don't know

*** 9. During this hospital stay, how often was the area around your room quiet at night?**

- Never
- Sometimes
- Usually
- Always
- I don't know
- I was not in the hospital overnight

5. About Your Hospital Experience

*** 10. During this hospital stay, did you need help from nurses or other hospital staff in getting to the bathroom or in using a bedpan?**

- Yes
- No

6. About Your Hospital Experience

Patient Experience Survey

*** 11. How often did you get help in getting to the bathroom or in using a bedpan as soon as you wanted?**

- Never
- Sometimes
- Usually
- Always
- I don't know

7. About Your Hospital Experience

*** 12. During this hospital stay, did you need medicine for pain?**

- Yes
- No

8. About Your Hospital Experience

*** 13. During this hospital stay, how often was your pain well controlled?**

- Never
- Sometimes
- Usually
- Always
- I don't know

*** 14. During this hospital stay, how often did the hospital staff do everything they could to help you with your pain?**

- Never
- Sometimes
- Usually
- Always
- I don't know

9. About Your Hospital Experience

Patient Experience Survey

*** 15. During this hospital stay, were you given any medicine that you had not taken before?**

- ○ Yes
- ○ No

10. About Your Hospital Experience

*** 16. Before giving you any new medicine, how often did hospital staff tell you what the medicine was for?**

- ○ Never
- ○ Sometimes
- ○ Usually
- ○ Always
- ○ I don't know

*** 17. Before giving you any new medicine, how often did hospital staff describe possible side effects in a way you could understand?**

- ○ Never
- ○ Sometimes
- ○ Usually
- ○ Always
- ○ I don't know

11. Leaving the Hospital

*** 18. After you left the hospital, did you go directly to your own home, to someone else's home, or to another health facility?**

- ○ Own home
- ○ Someone else's home
- ○ Another health facility

12. Leaving the hospital

Patient Experience Survey

*** 19. During this hospital stay, did doctors, nurses or other hospital staff talk with you about whether you would have the help you needed when you left the hospital?**

- Yes
- No

13. Leaving the hospital

*** 20. During this hospital stay, did you get information in writing about what symptoms or health problems to look out for after you left the hospital?**

- Yes
- No

14. Overall Hospital Rating

The next set of questions are about your overall rating of the hospital.

*** 21. We want to know your overall rating of your stay at this hospital (where 0 is the worst hospital possible and 10 is the best hospital possible)**

0 - Worst | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 - Best

*** 22. Would you recommend this hospital to your friends and family?**

- Definitely no
- Probably no
- Probably yes
- Definitely yes

15. Questions about you

The last set of Questions are about you.

Patient Experience Survey

*** 23. In general, how would you rate your overall health?**

- Excellent
- Very Good
- Good
- Fair
- Poor

*** 24. What is the highest school grade or level of education that you have completed?**

- Completed Grade 9 (that is Standard 7) or less
- Completed more than Grade 9, but no Matric or a trade certificate
- Got Matric or a trade certificate
- Completed some college or university but no degree
- Got a college diploma or university degree
- Completed more than a college diploma or university degree

*** 25. What language do you mainly speak at home?**

- Afrikaans
- English
- Another official South African language
- Some other language

16. Survey question

26. You may provide us with comments about this survey or about your hospital experience.

Those are all the questions.

Thank you for taking the time to complete the survey.

Appendix E: Breakdown of HCAHPS inspired survey questions

	Category		Question	Possible responses	Top box score
Questions relating to the hospital stay	About treatment from nurses		1	Never/Sometimes/Usually/Always/I don't know	5–Always
			2		
			3		
	About treatment from doctors		5		
			6		
			7		
	About the hospital environment		8		
			9		
	About the responsiveness of staff		4		
			11		
	About the management of pain		13		
			14		
	Information about medication		16		
			17		
	Information upon discharge		19		1 – Yes
			20		
	Screening Questions	Did the member need bathroom assistance	10	Yes/No	
		Was the member on pain medication	12		
		Did the member take unfamiliar medication	15		
		Where did the member go after discharge	18	Own home/Someone else's home/Another health facility	
	An overall rating given to the hospital		21	0,1,2,3,4,5,6,7,8,9,10	9,10
	Whether the member would recommend the hospital or not		22	Definitely no/Probably no/Probably yes/Definitely yes	
Questions about the member	Self-rated health		23	Excellent/Very Good/Good/Fair/Poor	
	Level of education attained		24	6 levels of education	
	Language spoken at home		25	Afrikaans/English/Another official South African language/Some other language	
Free text	A general comment		26		

Appendix F: Methodology of converting patient experience score calculation to risk-adjusted scores (unpublished, medical aid administrator)

Step One: Calculation of raw results

(i) For each question, calculate the proportion of people giving a top box response to the hospital. A top box score is the most positive responsive rate in each of the questions in the patient experience survey – this includes (i) a rating of 9 or 10 where patients are required to rate experience out of 10; (ii) a worded rating of 'Always' and (iii) 'Yes' selection from Yes/No questions. This is detailed in Annexure B.

(ii) In each category (Nurses score, Doctors score etc.), calculate the straight average of the proportions obtained in step 1 above for all the questions making up that category. This gives the average proportion of people giving a top box response for that category.

(iii) Combine the proportions obtained in step 2 to come up with an overall score for the hospital. This process requires the use of appropriate weights in combining the scores in step 2 to form one composite score. The methodology used to weight the categories is called Principle Component Analysis (PCA).

Step Two: Principle Component Analysis

A collection of observations of potentially correlated variables are transformed into a set of values of linearly uncorrelated variables called principle components using the statistical technique of principal component analysis (PCA). There may be factors within each of the 8 categories of the HCAHPS-inspired survey that are associated with other variables within the other categories. Every category can now represent a different or separate characteristic thanks to PCA's output of weights, which corrects for cross-category correlation and greatly broadens the scope of the composite. It enables the most variable variables or categories to be weighted more heavily than the rest. This incorporates additional information into the composite score and accounts for both volatility within and between categories.

The resulting weights derived from PCA and used across the categories; each year are summarised in the table below:

Table 8: PCA weights

Category	PCA Weights
Nursing	14.6%
Staff responsiveness	9.6%
Doctors	12.3%
Environment	12.3%
Pain management	13.2%
Medicine information	12.9%
Discharge information	11.3%
Q21	13.7%

Step Three: Calculation of the unadjusted composite score

Unadjusted Composite score = Nursing top box score * PCA weight nursing + Staff responsiveness top box score * PCA weight_staff_responsiveness + Doctors top box score * PCA weight_doctors + Environment top box score * PCA weight_environment + Pain management top box score * PCA weight_pain + Medicine information top box score * PCA weight_medicine + Discharge information top box score * PCA weight_discharge + Q21 top box score * PCA weight_q21

Step Four: Case-Mix-adjustment exercise

The following factors were adjusted for in line with HCAHPS methodology. Survey questions around self-rated health, language and education status were obtained from patient's answers to these questions. Gender, age band, lag in survey response time and type of admission (medical/surgical) was obtained from the medical administrator's hospital claims data.