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# An evaluation of horizontal equity in surgical care for gallstone disease in a Caribbean country

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## ABSTRACT

**Background:** The aim of this study was to identify social injustice by evaluating horizontal equity (allocation of similar resources to patients with the same clinical needs) in surgical care for gallstone disease in a Caribbean Country.

**Methods:** We compared access to laparoscopic cholecystectomy (LC) for gallstone disease between a fee-for-service (private) and a government-funded (public) health-care system between 1<sup>st</sup> January and 31<sup>st</sup> August, 2018. We defined a prolonged waiting time as an interval of >90 days between the index diagnosis and LC. The data were examined using SPSS v23.

**Results:** Ninety-nine patients underwent LC in public (60) or private (39) hospitals. There was a significantly longer mean waiting time in public hospitals (336.4 ± 647.9 days vs. 20.2 ± 25.5 days; *P* 0.002) and significantly more hospital readmissions while awaiting LC (72% vs. 0%). In the public hospital system, fewer patients had ambulatory operations (8.4% vs. 51.3%; *P* < 0.00001) and the mean duration of operation was longer (2.4 ± 0.88 vs. 0.92 ± 0.34 h; *P* < 0.0001). There were no differences in morbidity or mortality between the health-care systems. Thirty-eight patients had prolonged waiting times due to: long pre-existent waiting lists (13), consumables out of stock (10), equipment malfunction (6), patient request (3), pre-operative Endoscopic retrograde cholangiopancreatography (2), unspecified (2) and anaesthetic optimisation (1). One patient in the private hospital had a delay >90 days while awaiting insurance pre-authorisation.

**Conclusion:** Horizontal inequity exists between the health-care systems. There is room for improvement through increased accountability for administrators, better resource allocation, proper equipment maintenance schedules and efforts to reduce waiting lists.

**Keywords:** Equity, healthcare, social

## INTRODUCTION

Even in the 21<sup>st</sup> century, modern society is plagued by inequality, with groups of persons being marginalised based on their gender, nationality, ethnicity, social status, sexual orientation and/or political persuasion. When marginalised groups cannot access the resources needed to improve and maintain their health, they are denied a basic human right.<sup>[1]</sup> The constitution of the World Health Organisation affirms

that the highest attainable standard of health is a fundamental right of every human being without distinction of race, religion, political belief, economic or social condition.<sup>[2]</sup>

Eliminating health inequity is a basic tenet of fairness and human right norms in modern society,<sup>[1,2]</sup> but it is unfortunate that health inequities still do exist. We sought to evaluate

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health inequities in access to surgical care in an Eastern Caribbean country.

## METHODS

This study was carried out in Trinidad and Tobago. This is the largest Anglophone island nation in the Eastern Caribbean, with a population of 1,317,714 persons at the most recent national census.<sup>[3]</sup> The World Bank estimated the island's gross domestic product among the highest in the region at US \$23.99 billion.<sup>[4]</sup>

The Government of Trinidad and Tobago provides free health care to all legal residents through a network of public health-care facilities, which are managed by Regional Health Authorities (RHA) under the auspices of the Ministry of Health.<sup>[5]</sup> There are no user fees generated at the point of service for patients who access the health-care system.<sup>[3]</sup> All costs generated at the point of care are funded from a yearly budget allocated to each RHA by the Ministry of Health.<sup>[3]</sup> The General Hospital in Port of Spain, which has an 850-bed capacity and serves a catchment of 700,000 persons, is one such public hospital.

There is also a parallel fee-for-service (private) health-care delivery system in Trinidad and Tobago that receives no government funding and is comprised 8 private hospitals with a capacity for inpatient surgery. The study was carried out at one public hospital, the General Hospital in Port of Spain, and one private hospital in Trinidad and Tobago.

The aim of this study was to identify social injustice by evaluating horizontal equity in access to surgical care between the two health-care systems. In order to do this, we selected a single disease process that required elective operative intervention, thereby excluding the need for emergent intervention as a potential confounder. We chose symptomatic gallstones as the surgical disease because this was often treated electively, sufficiently common to be treated in both health-care systems and had standardised treatment protocols. Several meta-analyses of randomised, controlled trials have supported level I recommendations for early laparoscopic cholecystectomy (LC), ideally within the index hospital admission, in patients diagnosed with biliary colic,<sup>[6]</sup> acute cholecystitis<sup>[7-10]</sup> and biliary pancreatitis.<sup>[11-13]</sup>

Approval was granted by the local institutional review board to collect data from patients who had LC during the period 1<sup>st</sup> January 2018 to 31<sup>st</sup> August 2018. Independent researchers accessed hospital admission logbooks and operating theatre registers at both facilities. All consecutive

patients who underwent LC during this period were identified. The patients' hospital records were retrieved and the following data extracted: Patient demographics, date of index admission, index diagnosis, interval between index diagnosis and LC, duration of LC (as a proxy for difficulty of operation), complications of LC, number of recurrent admissions and complications between index diagnosis and LC. In this study, we defined a prolonged waiting time as an interval of >90 days between the index diagnosis and LC. We searched for the documented reasons for delays in any patients with prolonged waiting times.

The patients were also contacted by telephone and interviewed about re-admissions and complications outside of hospital. All data were collated on an offline spreadsheet and descriptive analyses performed using SPSS v23 (IBM Corp. Armonk, NY, USA). We used a z-score test for proportions and the *t*-test for independent means to make comparisons between both groups. A *P* < 0.05 was considered significant in this study.

## RESULTS

Over the study period, LC was performed in 155 persons at the public hospital and in 39 patients at the fee-for-service facility. However, only 64 detailed patient records could be retrieved at the public hospital and a further 4 patients were lost to follow-up, leaving a total of 60 patients from the public hospital in the study cohort. Therefore, a total of 99 patients were included in the final study population. There were 92 (93%) females and 7 (7%) males at a mean age of 44.8 years (range 15–71; standard deviation [SD] ± 12.4).

The most common indications for cholecystectomy included biliary colic (35.4%), acute cholecystitis (29.3%) and biliary pancreatitis (14.1%), as outlined in Table 1.

The mean waiting time between index diagnosis and LC in public hospitals was 336.4 days (range 5–3387; median 125; SD ± 647.9) and 20.2 days (range 1–98; median 11; SD ± 25.5 days) in private hospitals. This difference of 316.2 days (approximately 45 weeks)

**Table 1: Diagnoses**

Diagnosis	Public	Private	Total, n (%)
Acute cholecystitis	15	14	29 (29.3)
Biliary colic	29	6	35 (35.4)
Chronic cholecystitis	6	4	10 (10.1)
Gallbladder empyema	0	5	5 (5.1)
Biliary pancreatitis	10	4	14 (14.1)
Gallbladder polyp	0	6	6 (6.1)
All	60	39	99

attained statistical significance. Table 2 compares waiting times according to the patients' diagnoses.

Table 3 compares the clinical outcomes between the health-care systems. In the public hospital, there were significantly more hospital readmissions during the interval while patients were awaiting surgery. In addition, there were significant differences in the number of ambulatory cases, duration operation and post-operative hospital stay between the health-care systems.

There were 38 patients with waiting times longer than 90 days. The documented reasons for prolonged waiting times in 37 public hospital patients included long pre-existent waiting list (13), consumables out of stock on OT day (10), equipment malfunction on OT day (6), patient request (3), coordination of pre-operative Endoscopic retrograde cholangiopancreatography (2), OT rescheduled for unspecified reason (2) and delay for anaesthetic optimisation (1). One patient in the private hospital system had a delay >90 days while awaiting insurance pre-authorisation.

## DISCUSSION

Health-care equity is the basic human right to access the resources needed to maintain and improve health, without remediable differences between groups of people.<sup>[1]</sup> There are two prevailing concepts in health-care equity. Vertical

equity is the concept where increased health resources and/or interventions are delivered to patients who have greater clinical needs.<sup>[14-16]</sup> On the other hand, horizontal equity aims to allocate similar resources to patients with the same clinical needs.<sup>[17-19]</sup>

In this study, we focused on horizontal equity in a common disease process for which clear international guidelines existed. There are evidence-based international guidelines recommending early LC in patients with symptomatic gallstone disease.<sup>[6-13]</sup> Early LC avoids dangerous complications such as gallbladder empyema or severe biliary pancreatitis.

Considering the fact that there is evidence documenting good outcomes from LC in the Caribbean setting<sup>[20,21]</sup> and the fact that both hospitals were able to perform LC, we purport that these countries have the capacity to adhere to standards of care in the surgical treatment of gallstone disease.

There was obvious disparity in horizontal equity, as patients in the public system had a significantly longer waiting times (45 weeks on average), more hospital re-admissions and greater complications between index diagnosis and LC. Therefore, the inequity does have real consequences for these patients. It also adds financial burden to the healthcare system. Although the financial consequences were not analysed in our study, it is an area that deserves future evaluation. It is clear, however, that greater effort should be made to correct the inequity that exists.

Our data showed that 42% of patients had prolonged waiting times for reasons that are amenable to correction (consumables out of stock or equipment non-functional on day of surgery). These can be addressed by proper equipment maintenance schedules, adequate ordering of consumables and increased accountability for OT managers. Long waiting lists accounted for prolonged waiting times in 26% of cases. This is not unique to our healthcare systems, as waiting lists have become

**Table 2: A comparison of the mean waiting time for laparoscopic cholecystectomy interval between index diagnosis and operation in two health-care systems**

Parameter	Public	Private	P
All diagnoses	336.4±647.9	20.2±25.5	0.001523
Biliary colic	282.8±487.4	9.0±6.0	0.091546
Acute cholecystitis	348.8±876.3	26.1±27.3	0.090140
Biliary pancreatitis	256.5±205.4	26±36.9	0.027329
Chronic cholecystitis	672.8±1073.1	22.5±16.3	0.134555

**Table 3: A comparison of clinical outcomes between two health-care systems**

Parameter	Public (n=60), n (%)	Private (n=39), n (%)	P
Ambulatory cases	5 (8.3)	20 (51.3)	<0.00001
Re-admissions while awaiting LC	43 (72)	0	<0.00001
Duration of operation (range)	2.4±0.88 (1.5-4)	0.92±0.34 (0.5-1.5)	<0.00001
Conversions	0	0	N/S
Hospitalisation (range)	1.92±1.65 (0.5-10)	1.1±0.90 (0.5-4)	0.00213
Complications	6 (10) SSI: 3 Bile leak: 2 CBD injury: 1	2 (5.1) Bleeding: 2	0.3843

LC: Laparoscopic cholecystectomy, NS: Not significant, CBD: Common bile duct

a modern barrier to healthcare across surgical specialties worldwide.<sup>[17,22,23]</sup> Although this study did not identify the reasons for long waiting lists, changes in scheduling and planning may result in more effective use of theatre time and reduce waiting lists.

Some may make the argument that acute inflammatory states such as acute cholecystitis or biliary pancreatitis may not have been appropriate to include in this analysis because a delay in the performance of LC was traditionally advocated. However, we included patients with these diagnoses because there is now a wealth of data supporting evidence-based recommendations for early LC in patients with acute cholecystitis<sup>[7-10]</sup> and acute biliary pancreatitis.<sup>[11-13]</sup> Early LC in these patients results in a reduction in hospital stay, reduced morbidity and earlier return to work.<sup>[7-13]</sup>

This study design does bring limitations. In this study, we used the duration of operation as a proxy for the technical difficulty of LC. We rationalised that each episode of cholecystitis would lead to increased scarring and adhesion formation, thereby increased technical difficulty of the operation. We do, however, acknowledge that individual surgeon skill could be a confounding factor also affecting operating time.

In addition, it is impossible to ignore the role of personal funding and healthcare insurance in the fee-for-service model, but these are morally irrelevant factors. Economic class should not be a governing factor when determining the allocation of health-care resources.

Other factors may also contribute to the healthcare inequity, such as social factors, geographic barriers, gender or race. However, we deliberately did not focus on these issues because the Government of Trinidad and Tobago has made provisions to eliminate these as barriers to healthcare. For example, there is a well-developed subsidised public transportation system that allows ready access to all areas of the country, eliminating geographic barriers. Socio-economic factors have been addressed by abolishing user fees in all government funded facilities. Furthermore, there is a centralised distribution system that allows health-care resources/consumables/pharmaceuticals to be allocated equally to all networked facilities, independent of political persuasion, gender or race. Although the Government of Trinidad and Tobago has laid the groundwork to deliver a good standard of universal health care through these protocols, there is still room for improvement to abolish horizontal inequity.

## CONCLUSION

Horizontal inequity exists between the health-care systems in Trinidad and Tobago as evidenced by longer waiting times, fewer ambulatory cases and greater hospital readmissions in the government-funded health-care system. There is room for improvement through increased accountability for administrators, better resource allocation, proper equipment maintenance schedules and efforts to reduce waiting lists.

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## Conflicts of interest

There are no conflicts of interest.

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