

DOCTORAL PROGRAMME

ESSAYS ON HEALTHCARE OPERATIONS IN INDIA

By

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INDIAN INSTITUTE OF MANAGEMENT
BANGALORE

2021

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A Dissertation submitted in Partial Fulfillment of the Requirements for the
Doctoral Programme of the

INDIAN INSTITUTE OF MANAGEMENT BANGALORE

2021

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Acknowledgements

As I reflect on my experience as a doctoral student, I am grateful to so many people who have helped shape this journey and several others who have been a part of it. I consider myself fortunate that Prof. Haritha Saranga supervised my dissertation. I cannot thank Prof. Haritha enough for the time and energy that she has dedicated to guide and encourage me. Her considerate and understanding nature added comfort and ease to every conversation. Her strong support throughout this journey and particularly during times of uncertainty is the key factor in completing this work. I also extend thanks to my dissertation committee member, Prof. Rajeev R Tripathi, who was always keen to share his knowledge and ideas and provided prompt feedback. I am also thankful to my dissertation committee member, Prof. U Dinesh Kumar, whose suggestions were immensely helpful in improving my work.

I feel glad that I served as a teaching assistant to some of the best teachers. Watching and understanding Prof. LS Murthy's and Prof. Anshuman Tripathy's teaching sessions in a classroom was a delight in itself. I am also obliged to Prof. Jishnu Hazra, who allowed me to take OM tutorial sessions which I enjoyed thoroughly.

I feel privileged to have stayed at the IIMB campus and cannot miss thanking the gardening, mess, security and housekeeping teams, which help maintain the beautiful campus ambience and also make our lives so much easier and comfortable. I appreciate the support extended by Ashoka ma'am, Shilpa ma'am and the Doctoral Programme office.

I also want to express thanks to my seniors Tarun, Papi, Krishnan, Kiran and Sreedevi, who shared their views and helped me whenever I approached them. I am happy that I came across and spent good time on the campus with Parvathy, Dhrithi, Abhipsa, Aanchal, Sudha, Vaneet, and Pravesh.

An indispensable component in this endeavor is my family's support. I appreciate my father for his words of encouragement and my brother for his love and concern. I am eternally grateful

to my mother, who always stood by me and lent a patient ear to anything and everything I had to discuss. I fall short of words to explain how supportive my husband, Pawan, has been throughout. His ability to stay calm and make things look much simpler has made my journey smoother. Finally, I would like to thank my late grandparents and particularly my grandfather, who was always fond of academics and made me fall in love with my studies.

Abstract

Healthcare systems are confronted with many goals, of which proper utilization of existing resources and reduction of wastage in terms of time and resource are essential for managing inefficiencies in the system. Both researchers and practitioners in medicine and operations management (OM) concur on the need to improve efficiency at different levels of the healthcare ecosystem (Green, 2012; Healthcare in India, 2017¹). This work seeks to address some of the operational challenges related to service delivery efficiency and resource utilization in the context of Indian healthcare. The three studies included in this dissertation examine the current approach and provide decision making support to stakeholders in two different healthcare settings.

In the first study, we adopt a macro-level healthcare perspective to address the shortage of cadaveric organs for transplant. The low organ donation rate, coupled with the high demand for transplantable organs, has resulted in long organ waitlists in India (Nagral and Amalorpavanathan, 2014; Srivastava and Mani, 2018). This research identifies the incentives and coordination mechanisms to improve the supply of cadaveric organs in the system. We develop an analytical model to study the interaction between the supply-side entities- a coordinating organization and a hospital that performs the organ retrieval, under a planner's supervision in a cadaveric organ supply chain. The study examines the hospital's channel decision between an uncertain unauthorized channel and an administratively more demanding authorized channel. We derive the conditions and the coordinating organization's optimal reimbursement fee to incentivize the hospital to participate in the authorized channel.

Further, we contrast the decisions and payoffs under cooperative and decentralized setups to understand if any benefits from cooperation are forthcoming at the individual and system

¹ Why Indian healthcare system needs to increase its efficiency. Retrieved from <https://healthcare-in-india.net/healthcare-delivery/why-indian-healthcare-system-needs-to-increase-its-efficiency/>

levels. Our results show that the choice of decentralized or cooperative supply chain is not entirely straightforward. This could guide the planner in choosing the right decision-making structure for the supply chain.

In the second and third studies, we shift attention to micro-level healthcare problems. In the second study, we examine the combined role of focus and coordination in improving service delivery in a multispeciality hospital context. While the operational focus is a well-researched topic (Hyer et al., 2009; KC and Terwiesch, 2011), the high degree of coordination necessary to manage interdependencies between various processes in a hospital environment has received less attention in OM. The hospital site in our study restructured its service teams and identified multiple units in the in-patient department to improve its care delivery. To study the impact of this intervention, we first carry out an in-depth case study to understand the coordination dynamics in the periods before and after the restructuring. We use the coordination theory lens to analyze and categorize the dependencies in the process. Thereafter, we carry out regression analysis using data on 18,205 in-patient discharges to investigate the intervention's impact, which we term as *coordinated focused care(CFC)*, on the discharge turnaround time at the hospital level. Our results suggest that *CFC* did lead to an improved outcome at the hospital level.

To further our understanding of the *CFC*, we study the factors that facilitate or hinder the impact of *CFC* on operational performance; to this end, we narrow down our analysis to each in-patient unit in the hospital in the third study. We use the relational coordination theory to develop relevant hypotheses and test them using the in-patient discharge data. We find that the level of improvement varies across the four in-patient units of the hospital. Insights from our interviews and observations helped us identify the factors that drive the within-unit differences. The findings reveal that team stability is an essential element that complements the relationship between *CFC* and operational performance.