

An Exploratory Study on the Benefits of Quality Accreditation: Financial Impact and Chief Executive Officer Perspectives

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ABSTRACT

Little systematic evidence exists in published literature about the net financial impact of the process of quality accreditation on hospitals that have undergone the process. This exploratory study aims to explore the financial impact of undergoing National Accreditation Board for Hospitals & Health Care Providers (NABH) accreditation in Indian hospitals, based on chief executive officers (CEOs') perspectives and the financial outcomes perceived by them. The attempt has been to provide a qualitative assessment of the costs and benefits of NABH accreditation on the financial health of the organization. As there were no leading studies to reference that could emulate the data available in the Indian context, the study team developed a set of financial indicators that could be collected from NABH-accredited hospitals. A total of 14 hospitals in Delhi, Ahmedabad, Mumbai, Bengaluru, Mysuru, Surat, and Chennai were included in the study. The CEOs of participating hospitals perceived that the NABH accreditation has been beneficial to their organization and that the overall quality of care for patients within their organizations has improved. In addition, they also confirmed improved awareness of statutory compliances, and of staff responses to emergencies, such as fire and cardiopulmonary resuscitation, and that data and evidence-based decision-making have helped in managing the facility better. The study suggests that the delivery of health care was positively influenced by NABH accreditation. The exploratory study also highlights the factors that may contribute to positive financial outcomes for hospitals. Specifically in terms of financial outcomes, the study has found that the income per used bed shows an increasing trend after the accreditation period. This may suggest medium- to long-term financial benefits to hospitals undergoing NABH accreditation.

Keywords: Chief executive officer perspective, Economic impact, Financial impact, Financial outcomes, Health care in

India, National Accreditation Board for Hospitals & Health Care Providers accreditation.

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INTRODUCTION

The health care sector in India is fairly heterogeneous in itself, and also caters to large and varied segments of society. A wide range of health care providers exist in the mixed public and private health system of the country. The public health system is characterized by a tiered structure ranging from primary health centers to tertiary hospitals. Likewise, the private health sector consists of a broad spectrum ranging from informal individual providers to highly renowned and often globally recognized health care institutions, and includes nongovernment organization-operated health care services as well as for-profit hospitals owned by individuals, partnerships, and corporate entities.

Despite years of strong economic growth and increased health spending by the government in the 11th 5-Year Plan period, the total spending on health care in 2013 to 2014 in the country was about 4.02% of gross domestic product (GDP).¹ The government spending on health care in India is only 1.15% of GDP. This is 3.8% of total government expenditure and accounts for 28.6% of total health spending. This translates in absolute terms to INR 1,042 per capita at current market prices.² Global evidence on health spending shows that, unless a country spends at least 5 to 6% of its GDP on health with government expenditure being a major part, basic health care needs are seldom met.³

The overall Union Health Budget proposed in 2017 has increased from INR 39,879 crore (1.97% of total Union Budget) to INR 48,878 crore (2.27% of total Union Budget). This is in line with the plan to increase health expenditure by the government as a percentage of GDP to 2.5% by

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2025.² At the same time, the out-of-pocket share incurred by households remains high, creating a vulnerability to catastrophic expenditure on health that impoverishes millions of Indians each year.

The hospital market in India can be broadly classified into government-aided and government-run hospitals, private hospitals (including trust and charitable hospitals, as well as small hospitals owned by individuals and partners), corporate hospitals, and private/public partnership hospitals.⁴ There are a number of drivers for continued growth of the hospital market in India, including the increase in noncommunicable and lifestyle diseases that often require hospitalization, more government initiatives purchasing services from hospitals on behalf of the poor and other vulnerable groups, and the growing health insurance market that removes financial barriers to access. This has also been associated challenges, such as a possible mismatch or shortage of hospital beds vis-à-vis the need thereof, shortage of health care professionals including paramedical personnel, and possible loss of focus on quality of health care services. One key trend that has emerged is the rise of multispecialty hospitals and specialty clinics. There are also diversified business approaches being tried, such as hospital chains and alliances, strategic expansion by providers based in metropolitan cities into tier II and tier III cities, and asset-light and capital-intensive business models.⁵

Private providers are playing a significant role in the growth of the Indian health care sector, accounting for 65% of the primary care facilities and 40% of hospitals in the country as per 2011 data.⁶ Over the last two decades, corporate hospital chains have also emerged and grown rapidly, often focusing on the top-end of the market. Some key corporate chains in India include Apollo Hospitals, Fortis Healthcare, Manipal Health Enterprises, Narayana Health, Max Healthcare, and Columbia Asia hospitals. As citizen expectations grow, economic growth continues and the affordability of health care improves with insurance mechanisms being available. There is a strong need to improve the quality of care provided across the heterogeneous mix of public and private hospitals in the country.

The NABH is a constituent board of the Quality Council of India, set up to establish and operate accreditation and allied programs for health care organizations. To attract a larger number of hospitals in a staged approach to investing in the quality of health care, NABH has recently introduced a multilevel accreditation process (<http://nabh.co/Hospital-EntryLevel.aspx>; accessed on March 29, 2016) starting with a Pre-Accreditation Entry-Level Certification followed by a Progressive-Level Certification and finally the Complete Accreditation

status. This helps hospitals commence their journey toward full accreditation in easier, incremental steps, also enabling a wider base of hospitals to improve their quality of services.

The fact that the government is providing incentives in their schemes for hospitals that are accredited by NABH is viewed as a positive step toward better quality patient care, both by patients and CEOs. In a bid to reward hospitals for investing in the quality of services they provide, NABH accreditation has been made a criterion for empanelment or for certain incentives under government-sponsored health insurance programs, such as the Central Government Health Scheme and the state government health insurance programs for the poor and informal sector in the states of Andhra Pradesh, Karnataka, Gujarat, and Meghalaya.⁷ The Insurance Regulatory and Development Authority (IRDA) of India issued a circular in July 2016⁸ which mandates that all 33,000 IRDA-empaneled hospitals must have entry-level NABH certification as part of the minimum criteria in order to continue as an empaneled hospital.

The accreditation of hospitals based on NABH standards has been acknowledged as an important tool in improving the quality of health care in the country. While this is being recognized by various sectoral stakeholders, there has also been a demand to understand the financial implications of accreditation, with the understanding that it will be a further incentive to hospitals if the experience so far suggests positive financial outcomes. The authors believe that such a study of the financial implications of NABH accreditation has not been attempted before. The objective of this study, therefore, was to explore financial and structural indicators of hospitals and find evidence for changes in financial outcomes during and after accreditation. This would help substantiate the belief that accreditation will have a positive impact on both the quality of health care and the economics of a hospital. While studies have been done in other contexts on the impact of accreditation on the quality of health care, the financial outcomes need to be studied more extensively. This study, therefore, constitutes an initial step, wherein the authors explored CEO perspectives of the financial implications of investing in NABH accreditation of their hospital. A more extensive confirmatory study continues to be on the future agenda for research.

RESEARCH METHODOLOGY

The authors surmise that this study is among the first of its kind in exploring the financial implications of investing in hospital accreditation, based on CEO perspectives and data on financial outcomes. As there were no leading studies to reference, the study team developed a

set of financial indicators, reporting on which was then requested from NABH-accredited hospitals. The extended study team supporting the authors comprised NABH assessors and other health care quality experts who had a deep understanding of the operational and financial aspects of a functioning hospital. The NABH-accredited hospitals that agreed to participate in the study are from all the major centers where NABH-accredited hospitals are located in the country. Each hospital was visited by an assessor who had participated in the NABH accreditation process as an assessor, or a hospital representative, or both. The predetermined questionnaire was sent to them before the visit so that the hospitals could keep the data ready to be discussed and clarified by the study team representative. The collected data were collated and analyzed for studying the financial impact. This research study was carried out between January 2016 and March 2016. Costs for the study and data collection were supported by the World Bank as part of their support to the Quality and Accreditation Collaborative, a working group of sub-national and national policymakers.

Sampling

Convenience sampling was used for this exploratory study. The primary criterion for selecting the hospital for the study was that the hospital should have received full NABH accreditation status at least 3 years prior to the study, i.e., before January 2013, to allow adequate time for the hospitals to perceive any changes in their finances. To keep the information relatively homogenous, all hospitals studied are private, multispecialty institutions, as they comprised the bulk of NABH-accredited hospitals on the cut-off date. The team estimated that a convenience sample of 15 hospitals, of varying bed sizes and in varied locations, would provide the diversity of information needed for this study. Hospitals in Delhi, Ahmedabad, Mumbai, Bengaluru, Mysuru, Surat, and Chennai were accordingly included in the final study sample. All the 15 selected hospitals were approached by the study group and a total of 14 hospitals shared data. The final sample included five hospitals with less than 100 beds, five hospitals with 100 to 300 beds, and four hospitals with more than 300 beds. The hospitals included for-profit/corporate entities, not-for-profit trust/society-owned organizations, and missionary/faith-based health care institutions.

As some of the data requested was considered confidential by the hospitals, the data were not always provided in the suggested assessable format. This gave us a total of eight hospitals that could be included in a multivariate analysis ranging in time from 2 years before the accreditation to 5 years after the accreditation. The sample set of data included 52 samples across the time

period of the study with most data being available for 1 year before the event of accreditation and until 2 years after the event.

The questionnaire used to collect data was finalized after a pretest undertaken at one of the participating hospitals. The data collection involved both telephonic follow-up as well as site visits to hospitals. The data included nonfinancial as well as financial indicators.

The financial data included overall income and expense statistics, and specific expenditure incurred in pursuit of NABH accreditation, which in turn included one-time as well as recurring expenses. Due to the perceived sensitive nature of the data, the hospitals were given the option of sharing the data as either the absolute number or as a percentage of total revenues for several parameters. Some participating hospitals gave only the percentages which could not be used for the statistical analysis conducted as part of this study.

The CEOs of the hospitals also answered a nine-question perception survey on a five-point Likert scale to indicate their impressions on the effects of NABH accreditation on their hospitals. The data are presented in Appendix 1.

Data Management Procedure

The data were collected through physical forms that were typed or handwritten. All the data requested were not provided by all the hospitals. Some gave aggregated data for some parameters, while others gave data in percentages. The variation in data form had to be taken into account while collating the data into a common format for analysis. This necessitated the elimination of data from four hospitals as they were either incomplete or in formats which could not be converted into the required format. Further, one more hospital's data were rendered unusable as the pre-accreditation information was missing. Overall, only eight hospitals' data could be used as per the requirements of the analysis. The data were then transformed into various parameters needed for the analysis. To improve commonality of interpretation across hospital data, certain macro-level constructs—either collected or transformed from data—were used for the analysis. The final data collated were coded appropriately to ensure confidentiality of the participants and their information. The CEO perception survey was completed by all 14 participating hospitals and were all used in the analysis.

Data Analysis

The final collated data were analyzed using the statistical tool IBM® Statistical Package for the Social Sciences (SPSS®) Statistics version 20. As the data collected were

Appendix 1: CEO questionnaire survey results

Q	1 = Fully agree; 2 = Agree; 3 = Neither agree/ disagree; 4 = Disagree; 5 = Fully disagree	Hospital												Average	SD
		1	2	3	5	6	7	8	9	11	12	13	14		
1	The facility is better managed and data and evidence for decision-making	2	1	2	2	1	2	1	2	1	1	1	4	1.636364	0.924416
2	Communication between departments and patient care teams has improved. Interdepartmental and interpersonal relationships have improved	3	1	2	2	1	3	2	2	2	2	2	4	2.181818	0.873863
3	Staff demonstration of their response to emergencies like fire, CPR, etc., has improved	1	1	2	1	1	1	1	1	2	1	2	3	1.454545	0.687552
4	Accreditation has helped to identify potential leaders in the organization	2	2	1	1	1	3	2	4	2	1	2	4	2.181818	1.07872
5	Staff morale has improved	3	2	2	1	1	2	1	3	2	2	2	4	2.181818	0.873863
6	Awareness of statutory compliances has improved	1	1	1	1	1	1	1	1	1	1	1	4	1.272727	0.904534
7	Complaints and grievances of patients have reduced	4	2	2	1	1	2	1	4	3	4	3	3	2.636364	1.120065
8	Overall quality of care to patients has improved	2	1	1	1	1	1	1	3	2	1	2	4	1.727273	1.00905
9	Overall, this has been beneficial to the organization	2	1	1	1	2	1	1	3	2	1	2	4	1.818182	0.98165

panel data across various time periods and various hospitals, it required a multivariate analysis to bring out the event period effects. To use the data for analysis, the data across the hospitals had to be brought to a comparable level. The number of beds was used as a factor to normalize the financial data for analysis. The initial analysis involved finding the correlation between important parameters collected (Appendix 2).

The multivariate analysis was done using the generalized linear model multivariate analysis tool provided in SPSS®. The dependent variables used were income per used bed, expense per used bed, income over expense per used bed, and NABH-related recurring expense per used bed. The fixed factor was the time period of $t - 2$ to $t + 5$, where t indicated the year of receiving the first NABH accreditation.

The results of the multivariate analysis indicated significant results. The Box's test result is nonsignificant ($p = 0.101$), indicating that the observed covariance matrices of the dependent variables are equal across groups. The multivariate tests are significant as indicated by the values of Pillai's Trace ($p = 0.043$), Wilks' Lambda ($p = 0.005$), Hotelling's Trace ($p = 0.000$), and Roy's Largest Root ($p = 0.000$). This indicates that there are between-group differences and significant differences across various time periods on the dependent parameters. Levens' test is nonsignificant, indicating that the error variance of the dependent variables is equal across groups. From the analysis of the between-subjects effect, it is noticed that the time point ($t + / -$) has a significant effect on the income earned. The parameter estimates indicate that the time period $t - 2$ to $t + 1$ has a significant effect on the income earned with a decreasing negative effect. In the time

period $t - 2$ to t , there is a significant effect on expenses with a decreasing negative effect. There is a significant negative effect during time $t - 2$ on income over expense. There are no significant effects on the NABH-related recurring expenses.

The contrast results of the customized hypothesis tests indicate that there is significant differences in income between time periods $t - 2$, $t - 1$, t , $t + 1$, and $t + 2$ with respect to $t + 5$. Also, there are significant differences in expense between time periods $t - 2$, $t - 1$, and t with respect to $t + 5$, and there is significant differences in income over expense between time periods $t - 2$, and $t + 3$ with respect to $t + 5$. Further, there are reducing negative coefficients indicating a reducing negative effect.

The survey questionnaire of CEOs containing nine questions (Appendix 1) yields averages, which indicate that the CEOs agree that NABH accreditation has improved overall patient care and that it has been beneficial for the organization.

RESULTS

The correlation analysis results indicate that income has a strong significant positive correlation (>0.7) with the number of admitted insurance patients, the number of nurses, and expenditure. The expenditure has a strong significant positive correlation with the number of admitted insurance patients, the number of nurses, and income. The income over expenditure has a significant positive correlation (>0.6) with income. The NABH-related recurring expenses has a significant positive correlation (>0.6) with number of staff in the Quality Department and Hospital Infection Control Department.

Appendix 2: Correlations matrix of some parameters

	Average stay	Insurance patients	Doctors	Nurses	Staff quality	Staff hospital infection control	Income	Expenditure	Income over expense	NABH one-time expense per bed	NABH recurring expense per bed
Average stay	1	0.598**	0.515**	0.781**	0.251	0.327*	0.701**	0.715**	0.329*	-0.239	0.313*
		0.000	0.000	0.000	0.055	0.012	0.000	0.000	0.011	0.068	0.016
	59	59	58	58	59	58	59	59	59	59	59
Insurance patient		1	0.239	0.696**	0.346**	0.383**	0.766**	0.763**	0.442**	-0.02	0.508**
		0.000	0.071	0.000	0.007	0.003	0.000	0.000	0.000	0.882	0.000
	59	59	58	58	59	58	59	59	59	59	59
Doctors		0.515**	1	0.408**	0.225	0.367**	0.332*	0.301*	0.361**	-0.235	0.266*
		0.000	0.071	0.001	0.089	0.005	0.011	0.022	0.005	0.075	0.043
	58	58	58	58	58	58	58	58	58	58	58
Nurses		0.696**	0.408**	1	0.551**	0.465**	0.839**	0.826**	0.528**	-0.085	0.566**
		0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.526	0.000
	58	58	58	58	58	58	58	58	58	58	58
Staff quality		0.346**	0.225	0.551**	1	0.687**	0.399**	0.365**	0.387**	-0.119	0.64**
		0.007	0.089	0.000	0.000	0.000	0.002	0.004	0.002	0.371	0.000
	59	59	58	58	59	58	59	59	59	59	59
Staff hospital infection control		0.383**	0.367	0.465**	0.687	1	0.49**	0.463**	0.429**	-0.118	0.656**
		0.012	0.005	0.000	0.000	0.000	0.000	0.000	0.001	0.379	0.000
	58	58	58	58	58	58	58	58	58	58	58
Income		0.766**	0.332*	0.839**	0.399**	0.49**	1	0.988**	0.622**	-0.083	0.429**
		0.000	0.011	0.000	0.002	0.000	0.000	0.000	0.000	0.53	0.001
	59	59	58	58	59	58	59	59	59	59	59
Expenditure		0.763**	0.301*	0.826**	0.365**	0.463**	0.988**	1	0.492**	-0.079	0.394**
		0.000	0.002	0.000	0.004	0.000	0.000	0.000	0.000	0.551	0.002
	59	59	58	58	59	58	59	59	59	59	59
Income over expense		0.442**	0.361**	0.528**	0.387**	0.429**	0.622**	0.492**	1	-0.071	0.416**
		0.000	0.005	0.000	0.002	0.001	0.000	0.000	0.593	0.593	0.001
	59	59	58	58	59	58	59	59	59	59	59
NABH one-time expense per bed		-0.02	-0.235	-0.085	-0.119	-0.118	-0.083	-0.079	-0.071	1	0.04
		0.882	0.075	0.526	0.371	0.379	0.53	0.551	0.593	0.593	0.761
	59	59	58	58	59	58	59	59	59	59	59
NABH recurring expense per bed		0.508**	0.266*	0.566**	0.64**	0.656**	0.429**	0.394**	0.416**	-0.04	1
		0.016	0.043	0.000	0.000	0.000	0.001	0.002	0.001	0.761	0.001
	59	59	58	58	59	58	59	59	59	59	59

*Correlation is significant at the 0.05 level (2-tailed); **Correlation is significant at the 0.01 level (2-tailed)

The correlation results indicate that the income increases in tandem with an increase in insurance-covered patients. Further, the number of nurses also has a positive impact on the income, indicating that more nurses correspond to an increase in number of patients handled, and thus the income. The results indicate that NABH-related recurring expenses are tied to the number of staff in the Quality Department and Hospital Infection Control Department, which also indicates the increased emphasis on these functions with the NABH accreditation process.

All the major multivariate tests are being validated as indicated in the section on "Data Analysis." The time period has a significant effect on the income earned per used bed. This is indicated by the parameter estimates and contrast results, showing that accreditation has a significant positive impact on the income per used bed with increasing time.

The expenses per used bed also experience a significant reducing negative effect from period $t - 2$ to t , which indicates that the postaccreditation expenses are not significantly impacted. The postaccreditation expense per used bed does not have significant effects for the rest of the period. This shows that accreditation has a favorable impact on expense per used bed and does not significantly increase the expense per bed.

The income over expense also experiences a significant negative impact in the period $t - 2$. The contrast results across $t - 2$ through $t + 4$ in comparison with $t + 5$ also show a significant effect for period $t - 2$ with a negative contrast estimate. This indicates that the long-term income over expense is positively influenced by accreditation, i.e., the growth in income exceeds the growth in expenses.

The NABH-related recurring expense has no significant effects across the time groups, indicating that this is not negatively impacting the financial performance of the hospitals.

Overall, the results indicate that NABH accreditation has a favorable long-term impact on financial outcomes of income, expenses, and income over expense.

The CEO questionnaire yields the result that the CEOs on average agree or strongly agree that NABH accreditation has helped in achieving the following:

- Improved awareness of statutory compliances.
- Improved staff responses to emergencies like fire, cardiopulmonary resuscitation (CPR), etc.
- Better facility management as data and evidence are used for decision-making.
- Better overall quality of patient care.

Overall, this has been beneficial to the organization.

The CEOs' opinions are indicative of the benefits perceived due to NABH accreditation. In the qualitative section of the CEO survey, almost all declared that

documentation had vastly improved in their institutions. The "improvement in medication safety" and "reduction in clinical and nonclinical errors" were cited in a number of questionnaires. Several CEOs mentioned an improvement in teamwork among staff and a "healthy work environment", leading to "higher staff satisfaction levels". There were no negative remarks. This combined with the quantitative data provides a strong indicator of long-term benefits, both financial and nonfinancial, of NABH accreditation.

DISCUSSION

The goal of this study was to explore the financial impact of NABH accreditation on hospitals based on CEO perspectives and financial outcomes. The attempt has been to bring out the benefits of the NABH accreditation on the financial health of the organization. The CEOs of participating hospitals agree that the NABH accreditation has been beneficial to the organization and that the overall quality of care to patients has improved. In addition, they also strongly agree that the awareness of statutory compliances has improved, the staff response to emergencies like fire, CPR, etc. has improved, and that data and evidence-based decision-making have helped in managing the facility better. These are indicators that the dynamics of providing high-quality health care have been positively influenced by NABH accreditation. For the purpose of this study, we have not attempted to quantify these perceived improvements into economic terms, such as potential savings from reduced liabilities arising out of reduced adverse events, or those of long-term implications of improved staff responsiveness and higher patient satisfaction. At the same time, the available information on financial outcomes is itself very encouraging, and may encourage more hospitals to seek and acquire NABH accreditation, thus improving investments in the quality of health care in India. This exploratory study highlights the factors indicating positive financial outcomes for hospitals. Specifically, the study has found that the income per used bed shows an increasing trend after the accreditation period. While the rate of increase is relatively low during the first 3 years, it substantially rises from the fourth year. This can be explained by the lower rate of increase of expense per used bed during the same period. This shows that while the expenses may be seen as increasing, the rate of increase in income is higher. This is also seen from the trend of income over expense, which also indicates greater surplus being generated. During the initial years of accreditation, the income over expense per used bed indicates a flat trend but increases from the fourth year with an increasing trend thereon. This indicates that the initial years of accreditation are

spent in consolidating and strengthening the quality of health care services, but the investments are likely to pay off even more in the longer run. Once the process and dynamics brought about by NABH accreditation is internalized in the initial years, a positive impact is seen on both the quality of health care and financial parameters.

Data analysis and the ensuing results indicate that NABH accreditation has a favorable long-term financial impact for hospitals. This is an encouraging sign for hospitals to adopt and maintain quality accreditation. Based on anecdotal evidence, the survey team heard that the cost of operations go up for hospitals to acquire and maintain NABH accreditation, and also the concern that these costs may need to be ultimately passed on to the patients resulting in increased cost of quality health care. While this may seem to be initially true, this study indicates that this increase in costs is a temporary occurrence during the preceding and initial years after the accreditation and stabilizes thereafter once the processes are set. The study results are an indication that the long-term economic benefits to hospitals are likely to be positively influenced by NABH accreditation, primarily due to rising revenues. Further study on the wider economic impact would be useful, which also factor in the economic benefit to patients vis-à-vis the changes in resource use arising out of accreditation. Such studies could then include calculations of the net present value of these and other economic benefits vis-à-vis the initial investments and opportunity costs invested in accreditation. This study was done with an intention to find the CEO perspectives and financial outcomes of NABH accreditation in a situation where no similar study has been done before. This led to the challenge of data collection both in terms of what to collect and how to collect it. Since the nature of the data is confidential, few hospitals did not share data in the format requested. The same limitation may exist in the future studies where data may be less forthcoming in required detail for studying the long-term economic impact.

At the same time, these indicative results need more robust validation. More sample sets ranging from $t - 2$ to $t + 5$ are required to reach more robust conclusions. Further, a balanced design needs to be done for the entire time period. Future studies will have to control for hospital characteristics like number of beds, location, differences based on specialties, the ownership type of hospitals, etc. to have more robust readings of financial as well as economic impact, and also use similar hospitals which did not undergo accreditation as a counterfactual. This study is limited to private hospitals and has excluded government-run hospitals, where the driver is not the

financial impact on the organization, but the economic impact aspect would still be relevant and useful to justify investments in quality. Given the sensitive nature of the data, the current study found significant bottlenecks in receiving data from the hospitals in the required formats; as a result, the data collected were not as detailed as initially planned. One of the lessons learnt is that if sufficient time and effort is spent in gaining the confidence of senior management at the hospitals along with assurances that hospital-specific data would be kept confidential, the bottlenecks faced could be reduced. Future studies will have to take into account differences, such as the financial goals of each specific hospital and the effect it has on how the hospital is managed.

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REFERENCES

1. National Health Mission. Indian Public Health Standards, 2013. India: National Health Mission; 2013 [cited 2016 Jul]. Available from: <http://nrhm.gov.in/nhm/nrhm/guidelines/indian-public-health-standards.html>.
2. Ministry of Health and Family Welfare. Framework for implementation national health mission. India: Ministry of Health and Family Welfare, Government of India; 2012-2017. Available from: <http://nrhm.gov.in/images/pdf/about-nrhm/nrhm-framework-implementation/nrhm-framework-latest.pdf>.
3. WHO. WHO global health expenditure atlas. Geneva: WHO; 2014 [cited 2014 Sep]. Available from: <http://www.who.int/health-accounts/atlas2014.pdf>.
4. Nagarajan G, Sheriff JK. Novel healthcare (hospitals)—creation an Indian perspective. *IJMFSMR* 2013 Apr;2(4):89-98.
5. Fitch Group. Health care earning drivers intact, capex to continue. New York: Fitch Group 2014 Outlook, Fitch Group, India Ratings and Research; 2014 [cited 2014 Jan]. Available from: <https://www.indiaratings.co.in/upload/research/specialReports/2014/1/31/indra31Health.pdf>.
6. Indian Healthcare Sector. Healthcare industry in India. India: Indian Healthcare Sector, Services; 2014 [cited 2014 Mar]. Available from: <http://www.ibef.org/industry/healthcare-india.aspx>.
7. La Forgia G, Nagpal S. Government-sponsored health insurance in India: are you covered? Directions in development. Washington (DC): World Bank.
8. Guidelines on Standardization in Health Insurance, IRDA/HLT/REG/CIR/146/07/2016 available online, p. 23.