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Working capital management and financial health of private hospitals of India after COVID-19 pandemic

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***Abstract*---**The main objective of this study is to reduce working capital requirements, and to reduce the investments of private healthcare providers in their operating activities .A fundamental research was conducted by conducting a survey of 55 non- profit private hospitals of India in the period (2018-2021). Authors conceptualized a research model to develop hypotheses. Correlation between financial elements and the capital structure relevance was found out. Result indicates that, during COVID-19 pandemic, private hospitals made balance in working capital by allowing capital gap while adopting a delay payment strategy. Operating activities of the hospitals were financed by profit and working capitals of the hospitals are varying according to their financial need. It was suggested that the government needs to change healthcare policy, and give some funding and tax waiving hospitals. This study will be very helpful for the healthcare providers, hospital managers, medical staffs and other stake holders.

***Keywords*---**Healthcare, Ecosystem, Financial Management, Research Model, Profit.

Introduction

Healthcare in terms of employment and revenue has become the largest sector of the Indian economy after Covid-19 pandemic. Healthcare ecosystem (fig-1) of India consists of public & private hospitals and laboratories ,patients, pharmacy-companies, investors/medical universities/ charitable trust, technology provider, insurance company, regulators and policy makers both from government & private ,e- health & telemedicine/M- health etc. After the pandemic India government mainly increased expenditure by focusing on hospitals, clinical trials, medical tourism, medical health equipment and health insurance, medical device outsourcing of the healthcare sector of India. Since a very high demand is created in the health sector after the pandemic hit due to rise in health awareness, increased digital access to health insurance and hospitals, and rise of health emergency needs. Healthcare market is expected to touch 372 billion US $ by 2022-2023. In the union budget 2022-2023, finance minister Nirmala Sitaraman has announced about creating a "National Digital Health Ecosystem" by building the best health care infrastructure in India to help people of India to come out from pandemic health disasters. A budgetary provision of 37,800 Cr. rupees, were allocated for the "NHM "healthcare sector of India.

Healthcare ecosystem of India (fig-1) is a set of heterogeneous nature of stakeholders. So it is definitely very crucial compared to other sectors, to manage the hospital's finances optimally. After Covid -19 pandemic hit, it is essential to study the working capital management of the hospitals, which is known to be the essential element of financial management.

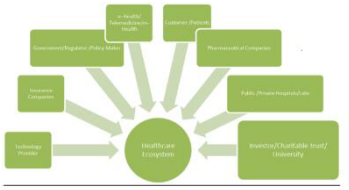


Fig-1 : Healthcare Ecosystem of India

According to the IBEF report 17th December 2021, the private healthcare system provides majority healthcare institutions in tire (1) and tire (11) cities in India. Large number of trained doctors, medical professionals, low surgery and medical service cost are the comparative advantage of India healthcare sector over other countries like Western Europe and Asian countries. These countries' surgery costs are ten times more costly than India. On 19th November 2021, more than 115 Cr. Covid vaccines have been given to people across the country. Due to Covid -10 pandemic ,the healthcare market rose three times to Rs.8.6 trillion (134.44 billion US$). Health insurance companies growth rises from 13.3% YOY to 7.9 billion (Rs.58.572 Cr.) (source IBEF report).

As per the report of "Indian Tourism Statistics at a glance 2020", for medical treatment (697,300) numbers of foreigners in FY19 came to India for medical treatments. In the MTI (the medical tourism index) for the year 2020-2021, India got 10th rank. During covid pandemic, FDI inflows for medicine and pharmaceuticals reaches at 18.12 US$ billion. According to DPIIT (Department for

promotion of industry and internal trade) following initiatives were taken by the India government mentioned below.

- By 18th November 2021, AB-HWCs (Ayushman Bharat Health and Wellness centers) 80,136 centers were established in India.
- 638 e-Hospitals were set up by "digital India initiatives of India government.
- Flipkart group launched flipkart health plus services to deliver online medicine all over India in November 2021.
- In 21 September 2021, e- Sanjeevani telemedicine services of India reached 12 million tale consultations.
- In September 2021, Biological E . Ltd made an announcement of a new vaccine in October 2021.
- In September 2021, sputnik light got permission for trial in India for vaccine dose.
- In July 2021, covid -19 vaccination platform COWIN was made by India and 76 nearby countries showed interest and joined in leveraging this COWIN vaccination platform.
- Private player Tata Digital given Rs.100 Cr debt for online medicine platform startup 1mg.

Review of literature:

Since this study is purely based on the financial data of private sector hospitals in India, authors made the literature review in the perspective of working capital management in the company to analyze the key financial indicator of the company. In (2017), Gavurova et.al, said that in financial management, working capital management is the most essential element. It not only helps to maintain the company's liquidity but also helps in maintaining profitability of the company. Usually in the balance sheet of the company WC (Working capital) refers to the current liabilities and current assets. Again the difference between this CA (current assets) and CL (current liability) is the net working capital. This depends on financing current liability by long term assets and also on long term capital investment on current assets. In (1985) Shulman et.al said that, due both operating and financing activity of the company some form of current liability and current assets are resulted in the company balance sheet. In (1980)

According to the term net working capital (NWC) is constituted by WCR (working capital requirement of the company) and NLB (net liquid balance in the company). Cash, marketable securities minus short term liabilities is nothing but net liquid balance that came from company financing activity. In (1980) Rechards et.al were given a popular measure CCC (cash conversion cycle), which is very useful in financial management of the hospitals. In (1983) Pogue et.al said that shorter CCC is known to be very effective in financial management for working capital management purposes. In (1993) Arcelus et.al by considering the DCF (discounted cash flow) for their analysis and found that cash conversion cycle and value of the company are inversely proportional.

Mathematical, $CCC \propto 1/\text{Company value}$---------- eq.(1)

In (2013) Kieschnick et.al in their study by taking a sample of data from the period 1990-2006 of US corporations found the strong relationship between

shareholder's wealth and company's working capital requirements. But other researchers like , (1986) Hawawine, (2012) Etiennot et.al , (2005) Filebeek et.al , (2010) Highfield, (2017) Michalski et.al they all found that cash conversion cycle length mostly affected by ,size of investment ,types of industry. They also found other reasons like uncertainty in sales of the company, financial distress in growth and sales are responsible for aggressive financial management in working capital. In (2013) Ding et.al said that opposite conservative effects in the company in working capital management is due to the easy access to money in the capital market, and rise of internal funding in the company. They found by taking a large sample of Chinese firms ,financial constraints of the companies are due to non effective financial management in working capital.

From this, Cash and marketable securities – shot term liabilities = Net liquid balance (NLB) --------eq.(2)
Since, Net working capital = working capital requirement + Net liquid balance (NLB)----------eq.(3)
Working capital requirement of the company = net working capital – net liquid balance --- eq.(4)

Objectives for this study are mentioned as below

Objectives:

- To reduce working capital requirements in healthcare sector providers.
- To reduce the investments of private healthcare sectors in their operating activities.

In this study the main objective is to reduce working capital requirements in healthcare sector providers and thereby reduce the investments of private healthcare sectors in their operating activities. Based on these objectives the authors conceptualized a research model to derive the hypothesis from it.

Research model:

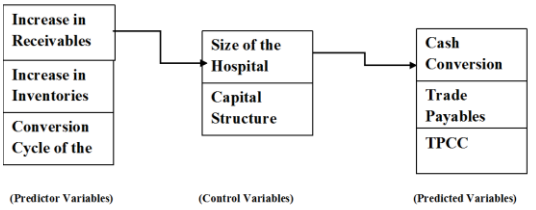


Fig.-2, Research Model Conceptualized by authors

The basic concept behind this model (fig-2) is that in India major private hospitals are showing to the government that they are non-profit organizations. Their main motives are social services, so they do not go for any financial investments from the hospital's earnings rather use it for hospitals working capital. Usually in a company, business owners prefer a shorter cash payback period to bear a low

cost from external sources of financing. This gives a generous amount of profits to the owner and this amount can be transferred to further investments. Hospitals are coming under the service industry, and they instantly paid their short term liabilities, as soon as they get their receivables. Further in India, it is difficult to mobilize a hospital's loan amount. Considering eq.(1),eq(2),eq(3) ,eq(4) and looking at the above scenario in hospitals, authors conceptualize a research model. For this, authors are assumed profits as a short term financing source. So that it will allow a capital gap by adopting a delay payment strategy. Increase in receivables, increase in inventories, conversion cycle of receivables are chosen as predictor variables. Sizes of the hospital, capital structure (long term debt/total assets) are chosen as control variables. Cash conversion cycle, trade payables, and TPCC are chosen as predicted variables. As in Indian private hospital inventory and receivables are financed through hospital's cash or hospital's profits so following hypotheses were taken from this research model mentioned as below.

H 1: Hospitals profits are positively correlated with the credit worthiness of hospitals.

Again since this study was conducted by taking nonprofit hospitals in India, it was observed that they do not follow a particular credit policy hence hypotheses taken as below

H2: Any changes in hospital's receivables are financed by trade liabilities.

Design/Methodology/Approach

This is a fundamental research based on 55 nonprofit hospitals of India in the period 2018-2021, with 2017 taken as base year for growth calculation. Authors conceptualized a research model (fig-2) to develop hypotheses and several dependent variables, independent variables and control variables were chosen for analysis and result interpretation. Hypotheses were made to find and prove the correlation between revenue, profit and investment of private hospitals, as well as their capital structure relevancy. Increase in receivables, increase in inventories, conversion cycle of receivables are chosen as predictor variables. Sizes of the hospital, capital structure (long term debt/total assets) are chosen as control variables. Cash conversion cycle, trade payables, TPCC are chosen as predicted variables. The variables chosen for this study are not homogeneous so authors used the "Huber-white's Robust standard method" for regression calculation. Here the ordinary least square method is used for calculation of the coefficient of regression.

The equation of the the OLS regression model with having *p* explanatory variables,

$Y = \beta_0 + \Sigma_{j=1..p} \beta_j X_j + \varepsilon$

Where Y = dependent variable

β_0 = the intercept of the model

" X_j = corresponds to the j^{th} explanatory variable of the model (j= 1 to p), and e is the random error with expectation 0 and variance σ^2".

For n observations, the predicted value of Y for the i^{th} observation is given by:

$y_i = \beta_0 + \Sigma_{j=1..p} \beta_j X_{ij}$

"Huber-White's Robust Standard Errors approach" but covariance matrix of the coefficient matrix is calculated by

$$cov(B) = (X^T X)^{-1} X^T S X (X^T X)^{-1}$$ ---------- (eq.i)

Where S = covariance matrix
it is under the assumption that
the residuals, mean 0 ,and not auto correlated.
"[i.e. $E[e] = 0$ and $E[ee^T] = 0$, means that S is the diagonal matrix whose diagonal elements are e_i^2. Multiplying S with $n/(n-k-1)$, for large n *resulted* difference is unimportant.]

"

Table -1.1 : Descriptive Statistics for predictor variable

Year	CCC Mean	CCC S.D	δCC Mean	δCC S.D	δTP Mean	δTP S.D	δTPC Mean	δTPC S.D
2018	7.652	19.771	-0.786	17.522	0.096	0.328	-0.186	12.639
2019	6.473	24.328	-1.179	18.235	0.174	0.520	1.218	15.651
2020	8.050	23.024	1.581	16.996	0.208	0.786	0.102	14.993
2021	5.050	26.357	-3.004	16.770	0.268	0.80	2.102	15.14316
For all years	6.867	23.406	-0.847	17.384	0.187	0.6399	0.809	14.609

Table -1.2 : Descriptive Statistics for predicted variable

Year	RCF Mean	RCF S.D	δAR Mean	δAR S.D	δINV Mean	δINV S.D	δRev Mean	δRev S.D	δARC Mean	δARC S.D	δINVC Mean	δINVC S.D
2018	0.063	0.070	0.091	0.546	1.482	11.523	0.061	0.205	-1.18	12.70	0.206	3.369
2019	0.059	0.079	0.119	0.386	1.425	11.50	0.103	0.342	0.120	10.114	-0.080	2.398
2020	0.064	0.072	0.318	1.251	2.832	16.152	0.094	0.187	1.487	15.022	0.196	1.791
2021	0.042	0.081	0.047	0.279	1.592	11.607	0.069	0.073	-1.14	12.54	0.246	2.345
For all the years	0.057	0.076	0.143	0.729	1.833	12.803	0.082	0.223	-0.18	12.701	0.142	2.539

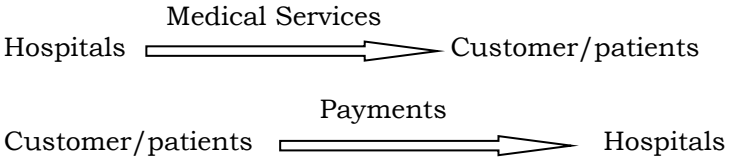
TABLE-1.3 :Control Variables (Descriptive Statistics)

Year	Ln(Asset) Mean	Ln(Asset) S.D	D (percentage) Mean	D (percentage) S.D	ARC Mean	ARC S.D	ATC Mean	ATC S.D	INVC Mean	INVC S.D
2018	3.204	0.879	0.287	0.195	37.33	16.05	35.02	20.98	5.339	3.94
2019	3.213	0.922	0.258	0.191	38.94	18.50	36.34	24.26	5.455	3.731
2020	3.274	0.931	0.261	0.193	37.79	21.04	38.44	24.06	5.701	4.748
2021	3.327	0.938	0.263	0.189	37.456	16.424	36.242	25.331	5.259	3.449
For all years	3.255	0.914	0.267	0.191	37.883	18.043	36.514	23.635	5.438	3.976

Data interpretation and results:

Private hospital's working capital decision in India during Covid -19 pandemic was very critical due to high rise of demand of hospitalization. Authors identified four players for game strategic decision for working capitals of the private hospital taken for this study. Authors observe that during the study period ,working capital decision taken by private owner was based on game theory strategic decision of four players such as private hospitals, insurance companies, national fund for Covid-19, customer or patient, supplier (Pharmaceutical companies, Oxygen plat, power supplier) to counterbalance pandemic disaster and save people's life. Private hospitals get huge demand since all the beds are full due to pandemics and working capital management seems to be a change for them during study period. Basically it was observed that the following way private hospitals' financial flow happened as described below flow diagram (fig-3).

Figure-3: (Financial flow in private hospitals, authors own study)



Customers made policy payments to insurance companies, and insurance companies paid the medical bills of the customers to hospitals. Pharmaceutical companies/ oxygen plant /power supply all supply inventory to the hospitals and hospitals paid them from the received payments from payments made by customer and insurance companies. Again central government, state government during covid-19 pandemic period without any cost, supply oxygen gas and covid related inventory, funds to private hospitals, which make working capital balance during higher rate of hospitalization due to pandemic situation of study period. Hospitals usually pay tax to the government, and customers/patients also give their contribution in national funds. Usually receivables of private hospitals in India are of two types. First regular payments which are received from planned medical procedures which were meant for life saving of patients /customers. Second one is the irregular payments coming from medical services of non life saving types. In the study period due to the sudden rise in demand of hospitalization working capital changes take place. Because due to lock down and pandemic situations other patients mainly underwent through telemedicine and online medical services/consultation, so private hospitals maintain inventory mainly for covid related requirements. For data analysis in this study authors took source of trade payables as different suppliers of hospitals like oxygen plant, power, water, pharmaceutical companies, hospital's regular staff as well as contractual staff. During study periods due to lockdown other than covid patients are very few in these hospitals. So, hospitals made the strategy of just in time approach, to maintain their inventory, so this study shows inventory is not so significant during this period. Since the author identified four players in the game strategy for working capital management, every player has an equal chance of win-win situation in this process.

For suppliers of hospitals, if revenue after operating cost and tax is positive then it will be a balanced working capital management process. Similarly for hospitals , revenue after revenue of the seller and operating cost of hospitals is either zero or positive then it will be a balanced process for working capital management within the group. Equation derived from this are mentioned as below

1. Revenue of supplier's - operating cost-tax > 0 ---------- eq .-(5)
2. Revenue of hospital's –revenue of supplier's- operating cost ≥ o ----eq.(6)

According to game theory if eq. (5) and eq.(6) are not attained for any reasons, then it creates the working capital changes. For this study nonprofit hospitals were taken for consideration, most of them found that they only work for social service, no profit taking motives persists from the survey data. So the author gave a suggestion that for good medical services, the government needs to give funding to nonprofits hospitals for their development to meet certain rise of demand or urgency of medical services, otherwise they will not be able to meet their working capital balance. These will result in poor medical services, low salary payment to medical staff. So a cash conversion cycle should be maintained to optimally

manage working capital in non profit private hospitals in India. The variables chosen for this study are not homogeneous so authors used the “Huber-white’s Robust standard method” for regression calculation using data of (table 1.1, table1.2, table1.3). Here the ordinary least square method is used for calculation of coefficient of regression. From the (table 2, table-2.1, table-2.2,in the annexure 1,2,3) panel regression both for fixed and random effect, at 0.01 level results show a significant positive correlation between RCF and the length of cash conversion cycle. (2003) Deloof said this direction of relationship will vary among commercial companies and the healthcare service sector. Moreover, these results also show size and debt ratio (D %) do not have any impact on cash conversion cycle length. From (table-2, annexure-1) at alpha level 0.01, length of cash conversion cycle profitability shows a positive correlation. However changes in the cash conversion cycle does not affect the debt ratio(D%) and size of the hospitals. From (table 2.2 annexure-3) at alpha level 0.01, a strong positive correlation was found between changes of TP and AR. But RCF shows negative correlation with trade payables and revenue is found as an irrelevant factor for hospital working capital management. So these results and findings confirm hypothesis H1 and H2 and these hypotheses are accepted.

Conclusion

Our research shows operating activities of the hospitals are financed by profit and it also varies according to the short term investment planning of different hospital’s management bodies. This study result also shows that the varying natures of the working capitals of the hospitals vary according to their financial need and urgency in the healthcare ecosystem. After Covid-19 pandemic “people’s healthcare” was everybody's priority. During Covid-19 pandemic, telemedicine rises suddenly due to lock down. It gives a boost to growth in the Indian healthcare sector. A huge demand for online remote consultation has risen. As per EY-IPA study report published in E-paper “the Economic times’ on September 8th 2020, in India healthcare sector telemedicine market will touch 5.5 billion US$, BY 2025, and house healthcare services will touch 10 billion US$. By looking at the pandemic effect, to give a boost to India's healthcare sector, the Indian government made a plan for CIP (credit incentive program)for 6.8 billion US$ (50,000 cr) during the pandemic. India government in the year (2021), has given approval to 157 new medical colleges and hospitals. In this study authors are suggested that, no doubt the Indian government has taken several steps to improve the healthcare ecosystem of the country, but at the same time financial management of private hospitals are equally important to carry forward these objectives. Private hospitals don’t have any flexibility to manage receivables during the study period due to pandemic. They tried to make an effective balance between the length of (hospital’s receivables and payables) cycle in hospital working capital management. The same theory outcomes also established by other researcher namely (2013) Arunkumar et.al, (2011) Sharma et.al, (2018) Pinku et.al, (2020) Bialek et.al This study will be very helpful for the healthcare providers, hospital managers and other stakeholders of the hospitals. Several researches have been done on the healthcare system, but rarely any study was conducted during this unprecedented Covid-19 pandemic on working capital management. So this study is definitely one of the rare in this healthcare ecosystem in India.

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Table -2 (Author’s own calculations)

Variables	**Fixed effects with robust HAC**		Random effects with robust HAC	
Const	**−1.48911**	**−9.12299**	−5.40978*	−4.69514*
RCF	**151.737*** **	**152.131*** **	52.8933***	52.7567***
LnAssets	**−2.79313**		0.392731	
D%		**−4.66708**		1.92245
dt_2	**0.263546**	**2.87791**	3.02212	−0.118153
dt_3	**2.41751**	**2.92075**	2.86527	2.36572
dt_4	**1.32645**	**2.58819**	2.69095	−1.06027
LSDV R-squared	**0.246527**		0.246475	
Within R-squared	**0.092619**		0.092557	
Durbin-Watson	**2.137775**	**2.140788**	2.137775	2.140788
Wald H0: No time effects-Chi square	**0.702518**	**0.569462**	1.63358	1.63716
Breusch-Pagan Chi-square			5.67056**	5.70442**
Hausman Chi-square			7.60294**	7.45616**

Annexure -1:

Annexure -2:

Table2.1- Pannel regression (with Robust HAC,CCC)

Variables	Fixed effects (robust HAC)		Random effects (robust HAC)	
Const	-0,647671	4,50526	**-0,0838994**	**3,89999**
RCF	121,960***	123,687***	**123,006*** **	**120,972*** **
LnAssets	0,169243		**−0,0274561**	
D%		-16,4259		**−13,7187**
dt_2	-0,675055	1,14167	**-0,0274561**	**−1,07458**
dt_3	0,271931	−0,135778	**0,271931**	**−0,0642620**
dt_4	- 0,0507351	−0,377580	**−0,00447969**	**−0,371556**
LSDV R-squared	0,741605	0,744131		
Within R-squared	0,093458	0,102322		
Durbin-Watson	1,429518	1,451992	**1,429518**	**1,451992**
Wald H0: No time effects-Chi square	0,312183	0,435622	**0,312183**	**0,424509**
Breusch-Pagan Chi square			**159,914*** **	**159,538*** **
Hausman Chi-square			**0,00416771**	**0,119737**

(Own Calculation)

Annexure-3:

Table-2.2 (for change in trade paybles)

Variables	**Fixed effects (robust HAC)**		Random effects (robust HAC)	
Const	**0.214036*** **	**0.135163**	0.0588181	0.0395795
ΔAR	**0.146771** **	**0.146312** **	0.161686**	0.162101**
ΔINV	**0.0292112**	**0.0283804**	0.0408377	0.0415997
ΔC	**0.00268832**	**0.00196845**	0.0408377	0.00311630
RCF	**−1.94113***	**−1.98457***	0.00320488	0.432148
ΔRev	**0.189976**	**0.196364**	0.317721	0.316532
LnAssets	**0.0316960**		−0.0100692	
D%		**0.289044**		0.0459940
dt_2	**0.0423200**	**0.0389006**	0.0714478	
dt_3	**0.0264751**	**0.0506371**	0.0672094	
dt_4	**0.0264751**	**0.0307181**	0.108961*	
LSDV R- square	**0.299800**	**0.301143**		
Within R- square	**0.073441**	**0.075218**		
Durbin-Watson	**2.046882**	**2.047266**	2.042267	2.047266
Wald H0: No time effects-Chi square	**0.809554**	**1.08012**	3.33189	2.98977
Breusch-Pagan Chi square			3.62457*	3.60804*
Hausman Chi-square			3.62457***	16.2214**

(Own study)