

## **Analysis of The Management of Three Tertiary General Hospital (2011 to 2013)**

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(Received April 15, 2016; Received April 22 2016; Accepted April 27, 2016)

### **Abstract**

**Purpose.** For more effective hospital management, it analyzes the trend through general characteristics, balance sheet, income statement, and financial ratio analysis, grasps the causes of the problems, and analyzes management of the hospital in order to use the result as baseline data for development of the hospital in the future.

**Methods.** The collected data of 3 years from 2011 to 2013 about 3 tertiary hospitals in metropolitan cities from Alio (provider of public institution information; [www.alio.go.kr](http://www.alio.go.kr)), Health Insurance Review & Assessment Service ([www.hira.or.kr](http://www.hira.or.kr)), and the website of the Ministry of Health and Welfare ([www.mw.go.kr](http://www.mw.go.kr)) were analyzed and general characteristics, balance sheet, income statement, and financial ratio, analysis are used as data.

**Results & Conclusions.** From the result of data analysis from 2011 to 2013, general characteristics, balance sheet, income statement, financial ratio analysis, and pie charts could lead to conclusions as follows. In the result of comprehensive analysis, the 3 tertiary hospitals showed increase of fixed expense due to extension of the buildings and so did the scale of fund and asset. Although medical revenue increased, the margin of increase for medical expense was greater than that of medical revenue, which consequently led to loss. In prediction for the 3 tertiary hospitals based on characteristics so far, it is expected to see improved revenue structure after building extension is completed, but it is necessary to exert management effort to maintain its optimal level by enhancement in stability of management and inventory turnover through management of inventories.

**Key words:** Balance Sheet, Efficiency, Financial ratio analysis, Hospital management analysis,  
Income Statement

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## 1. Introduction

Hospitals are generally non-profit public utility institutions. Due to their several unique characteristics, different hospitals have different hospital management environment, medical policy, health insurance system, medical consumers and competitive advantages over competitors. It is difficult for hospital management to control the external environment while the internal environment can be managed to a certain level. Therefore, there should be efforts to change the internal environment to a positive direction in order to survive, such as rationalization of management<sup>1-2)</sup>.

Typically, an analysis of hospital management uses a balance sheet, a profit and loss statement, a result of patient treatments, medical profits, human resources by the type of works, a result of facility use and general status<sup>3-8)</sup>. During reviewing previous studies to analyze the public nature and profitability of national and public university hospitals, there was a difficult in explaining the analysis results due to difference and no standardization in measurement indicators<sup>9)</sup>. The importance of this study includes all measures to analyze management results and financial performance, find underlying causes and provide the management and interested parties with useful information, based on management statistics such as financial data and patient treatment results covering the past, present and future planning<sup>3-8)</sup>.

There are growing demands on the necessity of analyzing efficiency of hospital management. As the external environment including controlling medical fees deteriorates, hospitals cannot sufficiently use or analyze hospital information necessary to identify the current status of management and find a way of management improvement<sup>10)</sup>. Therefore, the effects of management improvement are not likely to reach an expected level. The main reason is that a management system of hospital is not rea-

sonably implemented enough to deal with change of the external environment. Information that is required for important decision making for reasonable hospital management and operation is not systematically used. In addition, there is little opportunity of systematic training. Therefore, it is necessary for hospital management and administrators to systematically collect and classify hospital information for more efficient management of a hospital. This study aims to analyze and evaluate such information in order to utilize it for efficient hospital operation.

## 2. Methods

### 2.1. Research Subjects

Three tertiary general hospitals (A, B and C) were randomly selected among the national and public university hospitals that allows accessing to their data. As of 2014, A hospital has total 1,104 beds while B and C hospital have 970 beds and 1,324 beds, respectively. All three hospitals are a tertiary general hospital that is a representative hospital of a corresponding region. This study tries to systematically collect, analyze and compare information of each hospital for three consecutive years (2011, 2012 and 2013) to use as basic data and analyze financial status of tertiary hospitals for 2011-2013, which are provided by Public Institution Management Information Disclosure System ([www.alio.go.kr](http://www.alio.go.kr)), Health Insurance Review and Assessment Service ([www.hira.or.kr](http://www.hira.or.kr)), the Ministry of Health and Welfare ([www.mw.go.kr](http://www.mw.go.kr)) and accessible by the public. All data can be used for improvement of hospital management.

### 2.2. Purpose of Study

The purpose of this study is to provide hospital management and administrators with basic data for

systematic collection, classification, analysis and evaluation of hospital information in order to help them manage a hospital more efficiently.

Specific purposes of this study are as followings.

1. To identify common characteristics of organizational structure of a tertiary general hospital.
2. To analyze a balance sheet of a tertiary general hospital.
3. To analyze a profit and loss statement of a tertiary general hospital.
4. To conduct financial ratio analysis for a tertiary general hospital.

### 3. Results

For the number of employees, A hospital has 4,443 while B and C hospital has 1,851 and 1,464, respectively. For the ratio of the number of employees to a bed, A hospital has the highest ratio, with 4.024%, followed by B and C hospital, with 1.851% and 1.464%, respectively. For A hospital, there is limitations in analyzing profits and losses relating to its staffing structure because it does not disclose such information by a job position.

Table 1. Actual States of Medical Facilities and Staffs

(Unit: bed and person, %)

Category	A tertiary hospital	Category	B tertiary hospital	C tertiary hospital
Officer	11	Concurrent as Professor	146	144
		Concurrent as Clinician	57	82
Employee	3720	Fellowship	45	46
		Resident	268	252
Contract Worker	140	Total	516	524
		Nurse	699	797
Temporary Worker	572	General Staff	338	399
		Administration	242	216
Total	4443	Total	1769	1939
Ratio to # of Sickbed	4.024	Ratio to # of Sickbed	1.851	1.464

Source: (www.alio.go.kr),(www.hira.or.kr),(www.mw.go.kr).

#### 3.2. Summarized Balance Sheet

Table 2. Summarized Balance Sheet

(Unit: million Won)

Account Type	Balance Sheet								
	A tertiary hospital			B tertiary hospital			C tertiary hospital		
	2011	2012	2013	2011	2012	2013	2011	2012	2013
Asset									
I. Liquid Asset	145,444	161,360	193,621	153,456	143,781	119,568	85,067	61,174	58,695
II. Fixed Asset	444,566	453,882	455,434	259,333	259,333	299,467	134,844	185,827	177,527
Total Asset	590,010	615,242	649,054	403,115	403,115	419,035	219,911	247,001	236,222
Debt									
I. Liquid Debt	110,708	113,212	113,289	95,283	95,283	97,222	52,413	64,627	60,609
II. Fixed Debt	300,838	327,453	354,714	182,727	182,727	190,160	27,774	29,359	39,393
Total Debt	411,546	440,665	468,003	278,010	278,010	287,382	80,188	93,987	100,003
Fund									
I. Endowment Fund	270,059	283,153	301,349	192,227	192,227	208,074	115,114	130,722	132,343
II. Surplus Fund	(110,908)	(120,823)	132,019	(67,122)	(67,122)	(76,421)	24,610	22,292	51,639
Total capital	178,464	174,577	181,052	125,104	125,104	131,653	139,723	153,014	136,219

Source: (www.alio.go.kr),(www.hira.or.kr),(www.mw.go.kr).

3.3. Diagram of Balance Sheet Analysis

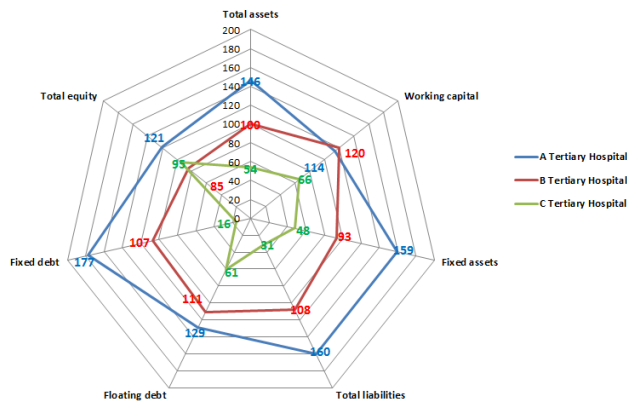


Figure1. Analysis Chart for Balance Charts of 3 Tertiary Hospitals in 2011 (Unit: %)

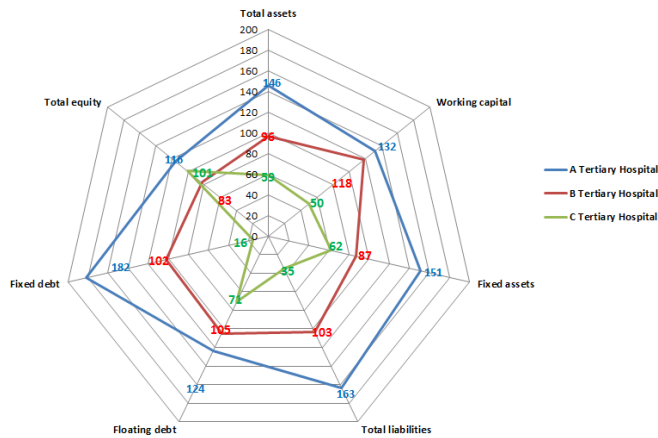


Figure 2. Analysis Chart for Balance Charts of 3 Tertiary Hospitals in 2012 (Unit: %)

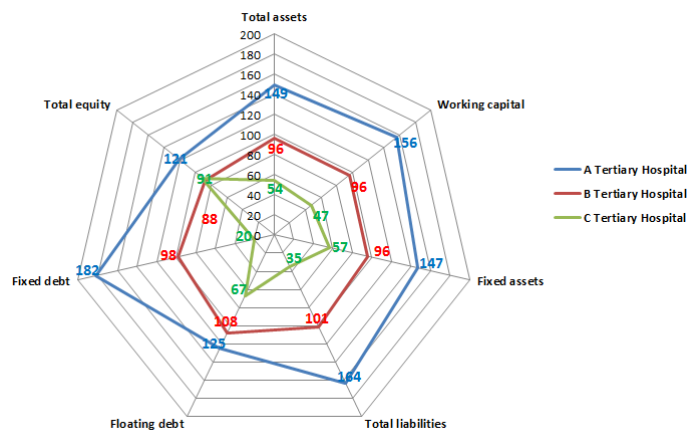


Figure 3. Analysis Chart for Balance Charts of 3 Tertiary Hospitals in 2013 (Unit: %)

### 3.3.1. Analysis of Balance Sheets of A Tertiary Hospital

The total asset, liability and capital of A Tertiary Hospital keep increasing for the last three years.

The ratio of the fixed assets is much higher than the current assets. However, the ratio of the current assets is increasing every year while the ratio of the fixed assets keep decreasing.

There is a high ratio of the quick assets in the current assets because the ratio of ‘cash and cash equivalents’ and ‘medical account receivables are high. The fact that the medical account receivables kept decreasing in 2012 and 2013 shows that management of the medical account receivables is stable. Most of the inventory is ‘medicine’.

For the fixed assets, the ratio of intangible assets is high. The ratio of ‘Buildings’ in the intangible assets is average 60% and that of “Finance Lease” is average 27%.

### 3.3.2. Analysis of Balance Sheets of B Tertiary Hospital

According to the analysis of last three year’s bal-

ance sheet of B tertiary hospital, the fixed assets has increased. In addition, it is found that there is a significant change of the liabilities. ‘Retirement Allowance’ has also increased. ‘Essential Business Reserve’ is used as a fund as it opened a new hospital building (216 beds) in 2013. As of 2013, ‘Work in Progress’ and ‘Essential Business Reserve’ have decreased while ‘Buildings’ has increased from KRW 40.3 Billion to KRW 42 Billion due to the completion of a new building.

### 3.3.3 Analysis of Balance Sheets of C Tertiary Hospital

There is no significant change of the current assets and the fixed assets on the balance sheet of C tertiary hospital. The current ratio has decreased as increasing the current liabilities was faster than increasing the fixed liabilities. It is analyzed that the percentage of labor cost on the profit and loss statement was 2% in 2012 but had significantly increased in 2013 because the capital and the net income kept decreasing from 2011 to 2013.

### 3.4. Analysis of Profit and Loss Statement

Table 3. Summarized Income Statement

(Unit: million Won)

Account Type	Income Statement								
	A tertiary hospital			B tertiary hospital			C tertiary hospital		
	2011	2012	2013	2011	2012	2013	2011	2012	2013
I. Medical Revenue	430,299	471,810	489,426	429,876	453,301	468,689	237,246	247,609	270,025
II. Medical Expense	435,355	467,787	490,197	439,053	468,532	494,454	240,068	256,705	292,694
III. Medical Profit	(5,056)	4,023	(772)	(9,177)	(15,230)	(25,765)	(2,822)	(9,097)	(22,669)
IV. Non-Medical profit	26,425	25,215	22,142	31,400	33,258	37,640	25,718	25,483	23,923
V. Non-Medical Expense	42,002	41,934	33,720	21,795	19,062	20,143	12,912	15,007	15,555
VI. Ordinary Profit	(20,633)	(12,696)	(12,349)	427	(1,033)	(8,267)	183	1,380	(14,301)
VII. Special Profit	1,230	449	627						
VIII. Special Loss				307	566	1,030			
IX. Corporate Tax & etc.							34	33	4,115
X. Current Net Income	(19,403)	(12,247)	(11,722)	119	(1,600)	(9,298)	9,950	1,346	(18,416)

Source: (www.alio.go.kr),(www.hira.or.kr),(www.mw.go.kr).

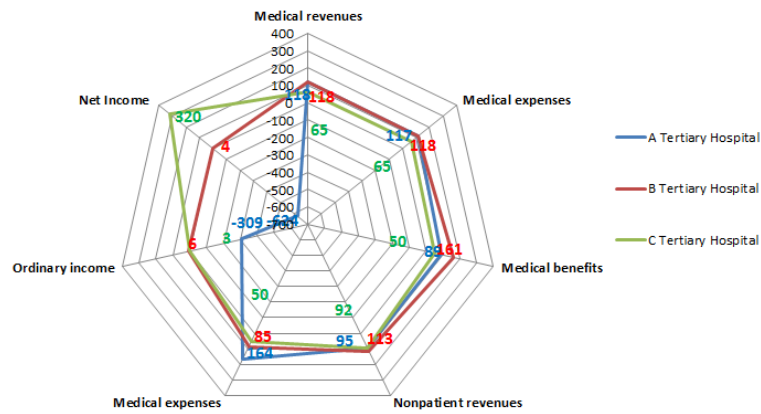


Figure 4. Analysis Chart for Management Performance of 3 Tertiary Hospitals in 2011 (Unit: %)

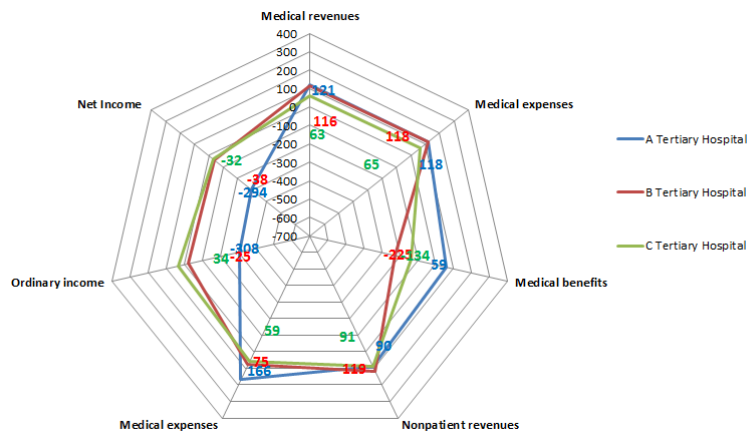


Figure 5. Analysis Chart for Management Performance of 3 Tertiary Hospitals in 2012 (Unit: %)

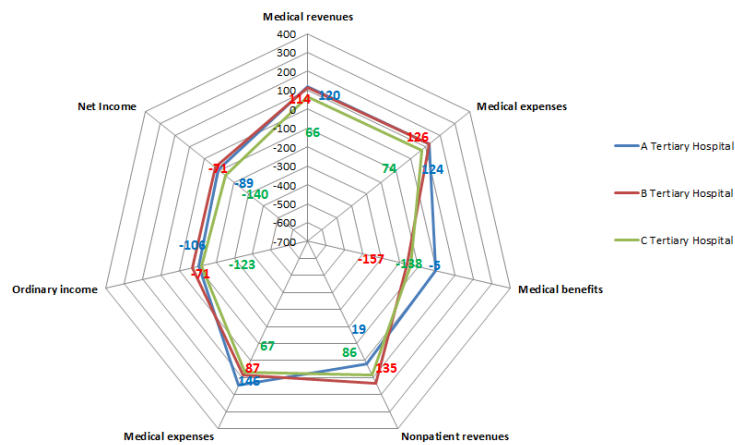


Figure 6. Analysis Chart for Management Performance of 3 Tertiary Hospitals in 2013 (Unit: %)

Source: (www.alio.go.kr), (www.hira.or.kr), (www.mw.go.kr).

### 3.4.1. Analysis of Profit and Loss Statements of A Tertiary Hospital

The medical income of A Tertiary Hospital keeps increasing for the last three years (2011, 2012 and 2013). The increase rate of medical income in 2012 was 9.6% while the income was increased by 3.75 in 2013. The main reasons of the increase in 2012 were increased income from outpatients and inpatients. The number of outpatients in 2012 was increased by 4.42%, compared to 2011.

The medical expenses are also continuously increasing. The increase rate of medical expenses in 2012 was 6.8% while the medical expenses were increased by 2.8% in 2013. The main reason of the significant increase of medical expenses in 2012 was labor costs and material costs due to the increased number of outpatients and inpatients.

The trend of other incomes rather than medical incomes shows decrease for three consecutive years but the supplementary incomes increased. ‘Essential Business Reserve’, which has a significant portion in ‘Expenses other than Medical Expenses’, has significantly decreased in 2012 and 2013. For the ordinary incomes, the negative value decreases as ‘Expenses other than Medical Expenses’ decreases rather than increasing ‘Incomes other than Medical Incomes’.

### 3.4.2. B Analysis of Profit and Loss Statements of B Tertiary Hospital

The net income of B Tertiary Hospital keeps decreasing for the three consecutive years (2011, 2012 and 2013). On the other hand, the medical incomes are increasing. As the increasing rate of

medical incomes is lower than that of medical expenses, the profit structure worsens. For details of the expenses, labor costs, material costs and management costs have increased. With such change, the medical loss increased from KRW 15.2 billion to KRW 25.7 billion and, as a result, the net loss was grown from KRW 1.6 billion to KRW 9.3 billion. Although the hospital recorded a positive figure in the net income in 2011, the net income had a negative figure from 2012 due to the construction cost.

### 3.4.3. Analysis of Profit and Loss Statements of C Tertiary Hospital

The analysis of the profit and loss statement of C Tertiary Hospital indicates that the medical expenses against the medical incomes have increased in 2011, 2012 and 2013. As the medical expenses against the medical incomes become higher, the net income worsens.

The reason why the medical expenses are increasing is that labor costs are increasing every year. The net income of C Tertiary Hospital is worsening due to its increased labor costs.

### 3.5. Analysis of Financial Ratios

A, B, C Comprehensive Analysis of Financial Ratios of Three Tertiary Hospitals Leverage Ratio – The debt ratio of three tertiary hospitals is maintained at a similar level for three years. However, it is analyzed that the fixed assets to stockholders' equity and long-term liabilities of B and C tertiary hospital reached almost 100%.

Table 4. outpatient, inpatient

(Unit: person. %)

Category	2010	2011	2012	2013
outpatient	739,649	738,619	771,307(↑4.42%)	795,925
inpatient	361,246	364,997	377,185	368,923

Source: (www.alio.go.kr),(www.hira.or.kr),(www.mw.go.kr).

Table 5. Analysis Table for Financial Ratios of 3 Hospitals (Unit: %, Day, Times, #of Times, Thousand Won)

Category	A tertiary hospital			B tertiary hospital			C tertiary hospital		
	2011	2012	2013	2011	2012	2013	2011	2012	2013
<b>I. Liquid Ratio</b>									
Current Ratio	131.4	142.5	170.9	175.6	150.9	122.9	162.3	94.7	96.8
Quick Ratio	129.5	140.6	167.1	172.0	146.1	117.4	161.9	94.3	96.5
Net Working Capital to Total Assets	19.5	27.6	44.4	16.8	12.0	5.3	14.8	-1.4	-0.8
Medical Expense Defensive Interval	135.5	138.5	155.4	134.0	116.3	89.9	137.6	92.9	79.2
<b>II. Leverage Ratio</b>									
Debt Ratio	230.6	252.4	258.5	234.8	222.2	218.2	57.4	61.4	73.4
Capital Adequacy Ratio	30.2	28.4	27.9	29.8	31.0	31.4	63.5	61.9	57.7
Interest Coverage Ratio	-2.9	-2.1	-2.3	1.2	0.3	-6.3	217.1	52.1	-166.4
Fixed Ratio	249.1	260.0	251.5	204.2	207.2	227.4	96.5	121.4	130.3
Fixed Assets to Long Term Capital Ratio	92.8	90.4	85.0	78.4	84.2	93.0	80.5	101.9	101.1
<b>III. Profitability Ratio</b>									
Medical Income to Revenue Ratio	-1.2	0.9	-0.2	-2.1	-3.3	-5.5	-1.2	-3.7	-8.4
Net Profit to Operating Revenues	-4.5	-2.6	-2.4	0.0	-0.3	-1.9	4.2	0.5	-6.8
Medical income to total assets	-0.9	0.7	-0.1	-2.3	-3.7	-6.1	-1.3	-3.7	-9.6
Net income to total assets	-3.3	-2.0	-1.8	0.03	-0.4	-2.2	4.5	0.5	-7.8
Return on Equity	-10.9	-7.0	-6.5	0.1	-1.2	-7.0	7.1	0.9	-13.5
<b>IV. Growth Ratio</b>									
Growth Ratio of Inpatient Revenue	10.72	11.34	-1.75	6.6	4.0	2.9	2.5	3.2	70.7
Growth Ratio of Outpatient Revenue	9.51	6.28	15.83	3.6	7.7	4.5	8.9	7.2	11.0
Total Asset Growth Ratio	0.0	4.3	5.5	6.3	2.4	3.9	15.1	12.3	-4.4
Net Income Growth Ratio	-15.4	-36.9	-4.3	-24.7	-1436.7	-481.1	300.4	-86.5	-1467.7
<b>V. Activity Ratio</b>									
Asset Turnover Ratio	0.7	0.8	0.8	1.0	1.1	1.1	1.1	1.0	1.1
Fixed Asset Turnover Ratio	1.0	1.1	1.1	2.2	2.3	2.0	2.9	3.7	4.7
Patient Accounts Receivable Turnover Ratio	6.8	7.4	9.7	9.2	9.7	13.7	6.9	8.6	10.5
Payables Turnover Ratio	8.2	8.4	8.2	7.4	7.6	7.8	6.1	6.2	6.1
<b>VI. Productivity Ratio</b>									
Value Added Ratio	45.5	45.5	46.5	43.3	44.5	45.0	57.3	56.9	54.8
Gross Value-added to Total Assets	109.7	123.1	125.7	158.7	161.5	160.2	61.8	57.0	62.6
Gross Value-added per Capita	68,561,581	75,235,448	79,675,658	102,366,362	110,953,003	115,822,045	87195304.9	89295099.7	88554261.8

Source: (www.alio.go.kr),(www.hira.or.kr),(www.mw.go.kr).



#### 4. Discussion

This study analyzed general characteristics, balance sheets, profit and loss statements and financial ratios of three tertiary general hospitals (A, B and C) for three consecutive years (2011, 2012 and 2013), using data disclosed by Public Institution Management Information Disclosure System ([www.alio.go.kr](http://www.alio.go.kr)), Health Insurance Review and Assessment Service ([www.hira.or.kr](http://www.hira.or.kr)), the Ministry of Health and Welfare ([www.mw.go.kr](http://www.mw.go.kr)). Analysis of hospital management was conducted using a result of patient treatments, medical profits, human resources by a job position and a status of facility, equipment and other general elements on the basis of the results mentioned above<sup>4-8)</sup>.

First, with regard to the number of employees, A hospital has 4,443 while B and C hospital has 1,851 and 1,464, respectively. For the ratio of the number of employees to a bed, A hospital has the highest ratio, with 4.024%, followed by B and C hospital, with 1.851% and 1.464%, respectively. There is limitations in analyzing profits and losses relating to its staffing structure because it does not disclose such information by a job position. During reviewing previous studies to analyze the public nature and profitability of national and public university hospitals, there was a difficult in explaining the analysis results due to difference and no standardization in measurement indicators<sup>9-11)</sup>.

Second, the analysis of balance sheets of three tertiary hospitals shows that there is significant difference in assets even among similar tertiary hospitals. As of 2015, A tertiary hospital has 1,263 beds while C tertiary hospital has 1,324 beds. Although C tertiary hospital has more beds than A tertiary hospital, the total asset value of A tertiary hospital is approximately 2.7 times bigger than that of C tertiary hospital. The total amount of assets of C tertiary hospital increased, except for 2013. For B tertiary hospital, the total amount of fixed assets

was significantly increased apparently by construction of a new building. On the other hand, A and C tertiary hospital completed construction of a new building in 2010 and 2007, respectively. All three tertiary hospitals made investment in a new building. For A and B tertiary hospital, their debt ratio, which means the ratio of debt to the total asset, was over 200%. As a result, it is important for them to reduce the debt ratio and increase stability of management.

Third, according to the analysis of profit and loss statements of three tertiary hospitals, the medical incomes ranged between KRW 40 billion and 20 billion. Although the increase ranges are different by a hospital, three tertiary hospitals commonly show continual increase of medical income for the three years, which indicates that national and public large hospital still make a profit even though the medical service market is in saturation. On the other hand, the medical expenses are also increasing and three tertiary hospitals have the medical expenses exceeding the medical incomes. Among the three tertiary hospitals, A tertiary hospital made a medical income only in 2012. For the incomes and expenses other than medical incomes and expenses, the ordinary income also decreases due to the increased expenses. As a result, it is shown in the analysis of the profit and loss statements for three years that all three tertiary hospitals had decreased profitability due to the excessive increased expenses although their incomes also increased during the same period of time. In addition, the analysis shows the change of medical income, medical expense, income other than medical income, expense other than medical expense, net income, ratio of inpatient's health insurance payment, ratio of outpatient's health insurance payment, medical profit ratio, net medical profit ratio and ordinary medical profit ratio by a year. It is demonstrated that the net income found in the analysis is similar with that of each national university hospital<sup>11,12)</sup>.

Fourth, according to the analysis of finance ratios of three tertiary hospitals, the ratio of fixed assets to stockholders' equity and long-term liabilities of three tertiary hospital reached almost 100%. Therefore, it is thought that additional debt management is necessary as debt may increase due to, for example, borrowing when the ratio exceeds 100%. Three tertiary hospitals shows decreased net income although the profits from both inpatients and outpatients are increasing because the expense such as labor costs, management costs and material costs have increased more quickly than the income<sup>11,13)</sup>. The increased ratio of fixed assets to stockholders' equity and long-term liabilities indicates the need of appropriate management of the owner's equity and the fixed debt<sup>11-15)</sup>. Therefore, the hospital shall seek to an appropriate level of profits through management of their debt.

Overall, the analysis of three tertiary hospitals shows the fixed cost increased due to a construction project and the size of capital and assets expanded. Although the medical income increases, the medical expense is more quickly increasing than the medical income. The inventory turnover ratio also decreased due to the loss of income, particularly the decreased net income. Considering such characteristics, it is expected that the income structure will be improved by utilizing a new building. In addition, it is also recommended that an appropriate level of inventory should be maintained by increasing the inventory turnover ratio through appropriate inventory management.

This study analyzed general characteristics, balance sheets, profit and loss statements and financial ratios, using data disclosed by Public Institution Management Information Disclosure System ([www.alio.go.kr](http://www.alio.go.kr)), Health Insurance Review and Assessment Service ([www.hira.or.kr](http://www.hira.or.kr)), the Ministry of Health and Welfare ([www.mw.go.kr](http://www.mw.go.kr)). However, it is necessary to supplement the data in the future as there are limitations in generalization when only

the official data is used.

## 5. Conclusion

First. with regard to the number of employees, A hospital has 4,443 while B and C hospital has 1,851 and 1,464, respectively. For the ratio of the number of employees to a bed, A hospital has the highest ratio, with 4.024%, followed by B and C hospital, with 1.851% and 1.464%, respectively. For A hospital, there is limitations in analyzing profits and losses relating to its staffing structure because it does not disclose such information by a job position.

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