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

Hyun-Suk Park

Department of Health Service Management, Daejeon University
(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), Health Insurance Review & Assessment Service (www.hira.or.kr), and the website of the Ministry of Health and Welfare (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

*Corresponding author :parkhs@dju.kr
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.

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. 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. 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.

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. 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 reasonably 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), Health Insurance Review and Assessment Service (www.hira.or.kr), the Ministry of Health and Welfare (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.

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                |
| Medical Doctors        |                     | Concurrent as Clinician | 57                 | 82                 |
| Employee               | 3720                | Fellowship             | 45                 | 46                 |
| Contract Worker        | 140                 | Resident               | 268                | 252                |
| Temporary Worker       | 572                 | Total                  | 516                | 524                |
|                        |                     | Nurse                  | 699                | 797                |
|                        |                     | Administration         | 242                | 216                |
| Total                  | 4443                | Ratio to # of Sickbed  | 4.024              | 1.851              |
|                        |                     | Ratio to # of Sickbed  |                    |                    |
|                        |                     |                        | 1.464              |                    |

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

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 2. Summarized Balance Sheet (Unit: million Won)

| Account Type | A tertiary hospital | B tertiary hospital | C tertiary hospital |
|--------------|---------------------|---------------------|---------------------|
|              | 2011 | 2012 | 2013 | 2011 | 2012 | 2013 | 2011 | 2012 | 2013 |
| Asset        |      |      |      |      |      |      |      |      |      |
| 1. Liquid Asset | 145,444 | 161,360 | 193,621 | 153,456 | 143,781 | 119,568 | 85,067 | 61,174 | 58,695 |
| 2. 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         |      |      |      |      |      |      |      |      |      |
| 1. Liquid Debt | 110,708 | 113,212 | 113,289 | 95,283 | 95,283 | 97,222 | 52,413 | 64,627 | 60,609 |
| 2. Fixed Debt | 300,838 | 327,453 | 354,314 | 182,727 | 182,727 | 190,160 | 27,774 | 29,359 | 39,393 |
| Total Debt   | 411,546 | 440,665 | 468,034 | 278,010 | 278,010 | 287,382 | 80,188 | 93,987 | 100,003 |
| Fund         |      |      |      |      |      |      |      |      |      |
| 1. Endowment Fund | 270,059 | 283,153 | 301,349 | 192,227 | 192,227 | 208,074 | 115,114 | 130,722 | 132,343 |
| 2. Surplus Fund | (110,908) | (120,823) | 132,019 | (67,122) | (67,122) | (76,421) | 246,102 | 222,922 | 516,39 |
| 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

Figure 1. 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 balance 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 | I. Medical Revenue | Medical Expense | Medical Profit | Non-Medical profit | Non-Medical Expense | Ordinary Profit | Special Profit | Corporate Tax & etc. | Current Net Income |
|--------------|-------------------|----------------|----------------|-------------------|---------------------|----------------|----------------|---------------------|------------------|
|              | A tertiary hospital | B tertiary hospital | C tertiary hospital | A tertiary hospital | B tertiary hospital | C tertiary hospital | A tertiary hospital | B tertiary hospital | C tertiary hospital |
|              | 2011 | 2012 | 2013 | 2011 | 2012 | 2013 | 2011 | 2012 | 2013 |
| I. Medical Revenue |
| 1. Medical Revenue | 430,299 | 471,810 | 489,426 | 429,876 | 453,301 | 468,689 | 237,246 | 247,609 | 270,025 |
| II. Medical Expense |
| 2. Medical Expense | 435,355 | 467,787 | 490,197 | 439,053 | 468,532 | 494,454 | 240,068 | 256,705 | 292,694 |
| III. Medical Profit |
| 3. Medical Profit | (5,056) | 4,023 | (772) | (9,177) | (15,230) | (25,765) | (2,822) | (9,097) | (22,669) |
| IV. Non-Medical profit |
| 4. 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 |
| 5. Non-Medical Expense | 42,002 | 41,934 | 33,720 | 21,795 | 19,062 | 20,143 | 12,912 | 15,007 | 15,555 |
| VI. Ordinary Profit |
| 6. Ordinary Profit | (20,633) | (12,696) | (12,349) | (20,633) | (12,696) | (12,349) | (20,633) | (12,696) | (12,349) |
| VII. Special Profit |
| 7. Special Profit | 1,230 | 449 | 627 | 427 | 1,033 | 8,267 | 183 | 1,380 | (14,301) |
| VIII. Corporate Tax & etc. |
| 8. Corporate Tax & etc. | 307 | 566 | 1,030 | 34 | 33 | 4,115 |
| IX. Current Net Income |
| 9. Current Net Income | (19,403) | (12,247) | (11,722) | 119 | (1,600) | (9,298) | 9,950 | 1,346 | (18,416) |

Source: (www.ali.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 (↑4.42%) | 2013     |
|----------|---------|---------|---------------|----------|
| outpatient | 739,649 | 738,619 | 771,307       | 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 |
|----------------------------------------------|---------------------|---------------------|---------------------|
| **Financial Ratio**                          |                     |                     |                     |
| 1. Liquid Ratio                              |                     |                     |                     |
| Current Ratio                                | 131.4               | 142.5              | 170.9              |
|     2011                                      | 175.6              | 150.9              | 122.9              |
|     2012                                      | 162.3              | 94.7               | 96.8               |
| Quick Ratio                                  | 129.5               | 140.6              | 167.1              |
|     2011                                      | 172.0              | 146.1              | 117.4              |
|     2012                                      | 161.9              | 94.3               | 96.5               |
| Net Working Capital to Total Assets           | 19.5                | 27.6               | 44.4               |
|     2011                                      | 16.8               | 12.0               | 5.3                |
|     2012                                      | 14.8               | -1.4               | -0.8               |
| Medical Expense Defensive Interval            | 135.5               | 138.5              | 155.4              |
|     2011                                      | 134.0              | 116.3              | 89.9               |
|     2012                                      | 137.6              | 92.9               | 79.2               |
| 2. Leverage Ratio                            |                     |                     |                     |
| Debt Ratio                                   | 230.6               | 252.4              | 258.5              |
|     2011                                      | 234.8              | 222.2              | 218.2              |
|     2012                                      | 57.4               | 61.4               | 73.4               |
| Capital Adequacy Ratio                       | 30.2                | 28.4               | 27.9               |
|     2011                                      | 29.8               | 31.0               | 31.4               |
|     2012                                      | 63.5               | 61.9               | 57.7               |
| Interest Coverage Ratio                      | -2.9                | -2.1               | -2.3               |
|     2011                                      | 1.2                | 0.3                | -6.3               |
|     2012                                      | 217.1              | 52.1               | -166.4             |
| Fixed Ratio                                  | 249.1               | 260.0              | 251.5              |
|     2011                                      | 204.2              | 207.2              | 227.4              |
|     2012                                      | 96.5               | 121.4              | 130.3              |
| Fixed Assets to Long Term Capital Ratio       | 92.8                | 90.4               | 85.0               |
|     2011                                      | 78.4               | 84.2               | 93.0               |
|     2012                                      | 80.5               | 101.9              | 101.1              |
| 3. Profitability Ratio                        |                     |                     |                     |
| Medical Income to Revenue Ratio              | -1.2                | -0.2               | -2.1               |
|     2011                                      | -3.3               | -3.3               | -3.5               |
|     2012                                      | -1.2               | -3.7               | -8.4               |
| Net Profit to Operating Revenues            | -4.5                | -2.6               | -2.4               |
|     2011                                      | 0.0                | -0.3               | -1.9               |
|     2012                                      | 4.2                | 0.5                | -6.8               |
| Medical income to total assets               | -0.9                | -0.1               | -2.3               |
|     2011                                      | -2.3               | -3.7               | -6.1               |
|     2012                                      | -1.3               | -3.7               | -9.6               |
| Net income to total assets                   | -3.3                | -2.0               | -1.8               |
|     2011                                      | 0.03               | -0.4               | -2.2               |
|     2012                                      | 4.5                | 0.5                | -7.8               |
| Return on Equity                             | -10.9               | -7.0               | -6.5               |
|     2011                                      | 0.1                | -1.2               | -7.0               |
|     2012                                      | 7.1                | 0.9                | -13.5              |
| 4. Growth Ratio                              |                     |                     |                     |
| Growth Ratio of Inpatient Revenue            | 10.72               | 11.34              | -1.75              |
|     2011                                      | 6.6                | 4.0                | 2.9                |
|     2012                                      | 2.5                | 3.2                | 70.7               |
| Growth Ratio of Outpatient Revenue           | 9.51                | 6.28               | 15.83              |
|     2011                                      | 3.6                | 7.7                | 4.5                |
|     2012                                      | 8.9                | 7.2                | 11.0               |
| Total Asset Growth Ratio                     | 0.0                 | 4.3                | 5.5                |
|     2011                                      | 6.3                | 2.4                | 3.9                |
|     2012                                      | 15.1               | 12.3               | -4.4               |
| Net Income Growth Ratio                      | -15.4               | -36.9              | -4.3               |
|     2011                                      | -24.7              | -1436.7            | -481.1             |
|     2012                                      | 300.4              | -86.5              | -1467.7            |
| 5. Activity Ratio                            |                     |                     |                     |
| Asset Turnover Ratio                         | 0.7                 | 0.8                | 0.8                |
|     2011                                      | 1.0                | 1.1                | 1.1                |
|     2012                                      | 1.1                | 1.0                | 1.1                |
| Fixed Asset Turnover Ratio                   | 1.0                 | 1.1                | 1.1                |
|     2011                                      | 2.2                | 2.3                | 2.0                |
|     2012                                      | 2.9                | 3.7                | 4.7                |
| Patient Accounts Receivable Turnover Ratio   | 6.8                 | 7.4                | 9.7                |
|     2011                                      | 9.2                | 9.7                | 13.7               |
|     2012                                      | 6.9                | 8.6                | 10.5               |
| Payables Turnover Ratio                      | 8.2                 | 8.4                | 8.2                |
|     2011                                      | 7.4                | 7.6                | 7.8                |
|     2012                                      | 6.1                | 6.2                | 6.1                |
| 6. Productivity Ratio                        |                     |                     |                     |
| Value Added Ratio                            | 45.5                | 45.5               | 46.5               |
|     2011                                      | 43.3               | 44.5               | 45.0               |
|     2012                                      | 57.3               | 56.9               | 54.8               |
| Gross Value-added to Total Assets            | 109.7               | 123.1              | 125.7              |
|     2011                                      | 158.7              | 161.5              | 160.2              |
|     2012                                      | 61.8               | 57.0               | 62.6               |
| Gross Value-added per Capita                 | 68,561,581          | 75,235,448         | 79,675,658         |
|     2011                                      | 102,366,362        | 110,935,063        | 115,832,045        |
|     2012                                      | 971953049          | 929250907          | 885542618          |

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), Health Insurance Review and Assessment Service (www.hira.or.kr), the Ministry of Health and Welfare (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 above4-8).

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 indicators9-11).

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 hospital11.12).
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. 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. 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), Health Insurance Review and Assessment Service (www.hira.or.kr), the Ministry of Health and Welfare (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.

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%.

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.

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. As a result, The it is necessary to appropriate management of the ratio of fixed assets to stockholders' equity and long-term liabilities

References

1. Yang DH, Kam HK, Jung DC. Hospital business analysis. chungram, 1st. 2011.
2. Jung KS, Hyundai of Hospital Business Analysis, jungusuljeok, 1st. 2005.
3. Available from http://www.alio.go.kr
4. Available from http://www.hira.or.kr
5. Available from http://www.mw.go.kr
6. Available from http://www.khid.or.kr
7. Park HS, Lee JM, Baek HS, et al. An Analytic Case Study on the Management of an Upper-level General Hospital(2010-2012). The Journal of Korean clinical health science, 2014;2(1):1-16.
8. Gapenski LC, Vogel WB, Langland-Orban B. The determinants of hospital profitability. Hosp Health Serv Adm. 1993 Spring;38(1):63-80.
9. Available from http://cafe.daum.net/terminology
10. Shin CG, An Analysis on the Efficiency and Productivity Changes of the National University Hospitals in the Republic of Korea. Korean Social Security Studies, 2006; 22(4):49-78
11. Park HS. An Analysis of the Management of a Tertiary General Hospital (2011 to 2013). The Journal of Korean clinical health science, 2015;3(1):276-289.
12. Baek SJ, Kim YH, Kim HS, et al. The Effects of Value Chain Activity on General Hospital Management Performance, Korean journal of hospital management, 2014;19(3):11-28.
13. Shin DW, Shin CG, Jung KT. A Study on Quality-incorporating Models in Evaluation of Hospital Efficiency with Data Envelopment Analysis-An Analysis on National University Hospitals in Korea, Korean journal of hospital management, 2008; 13(3):69-93
14. Park JY, Some Factors Affecting Profitability of Local Public Hospitals, Korean journal of hospital management, 2007;12(3):47-67.
15. Lee CE, Major Factors Influencing on the Financial Performance of Local Government Hospitals, The Korean Journal of Health Service Management, 2010;4(1):99-110.