

A Study on Efficient Management by Analyzing Revenue and Expenses of Mega Hospitals

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Abstract— *The purpose of this study is to identify the causes of fiscal deficits of tertiary hospitals in metropolitan areas, by analyzing the profits and expenses, and to suggest alternatives to resolve them. It is based on the objective profitability index of medical profitability, and adopts hospital's income statement and statement of financial position to single out the items that can increase profits while reducing expenses, suggesting an appropriate strategy for this. In order to increase the profits of hospitals, it is necessary to increase the bed turnover rate and improve benefits of emergency surgery, along with the efforts to reduce labor expenses, material expenses, and management expenses. This can contribute to improving the quality of care over the long term by securing hospital interests..*

I. INTRODUCTION

The metropolitan tertiary hospitals provide medical care and services, but also performs in-depth medical research, medical education, training and technology development at the same time.

1) Stable profit generation is necessary for the facility investment and for research and development, and this is the basis for providing high quality medical services. In other words, the pursuit of profitability of hospitals is an essential and important factor for improving the quality of medical services that is the goal of hospitals. In particular, it can also be seen as an essential purpose in providing sustainable medical services in the face of changes in society such as aging, medical service, and health insurance system. However, medical centers in Korea continues to record deficits. In addition to local medical centers and small and mid-sized hospitals, even large hospitals face a deficit despite of its acceleration. According to the public institution management information system as of 2017, 9 out of 10 national hospitals in 2017 reported medical deficits, and only one of the so-called domestic big five hospitals (Seoul National University Hospital, Asan Social Welfare Foundation, Yonsei Medical Center, Samsung Medical Center, Catholic Medical Center) grew medical profit over the previous year.

2) Various analyzes and studies affecting financial position and profits of medical centers have been conducted over the previous periods. 1) ~30) In one study, factors such as hospital utilization rate, bed turnover rate, labor rate, material rate, management rate, and average daily medical expense per outpatient per day were cited as factors that influence the profitability of local medical centers. 3) Among other factors, in several studies, bed utilization rate, bed turnover rate, and labor expense have been steadily revealed as important variables which influences the profits of medical centers. 3),4), 5), 6) Initial medical examination rate of outpatient is

also an important variable, and high labor rate has also been pointed out as a cause of deficit. (3,4,6,7,8,9,10). Besides, there are also studies identifying various variables as major improvements in hospital management, such as material rate, management rate, improvement on quality of care, and development of new medical services, etc. (11, 12, 13, 14, 15, 16)

This study analyzes the items of profits and expenses based on the profitability index of 29 large general hospitals to identify important variables affecting finances, and aims to improve the weak financial structure by suggesting improvement plans to above.

In addition, this study compares various indicators of the general hospital and the mid-sized hospital with more than 300 beds and studies the main causes of the hospital's profits based on the difference of the indicators. The goal of this study is not only to analyze the financial performance of hospitals but also to provide useful data for profitability improvement and expense reduction.

II. THEORETICAL BACKGROUND

1. Subjects and Methods of Analysis

The research subjects as an index of medical profitability includes 29 tertiary hospitals in metropolitans and 53 med-sized hospitals with over 300 beds as of 2016. The research data was based on the '2016 Hospital Management Analysis' obtained from the National Tax Service. The financial statements and income statements of tertiary hospitals in metropolitans and med-sized hospitals with over 300 beds were investigated, and the relationship between the ratio of each items and profitability index was analyzed.

2. Definition of Terms

Profitability varies from gross capital medical profit ratio, gross capital ordinary profit ratio, and gross capital net profit ratio. Since hospitals do not reassess their assets, the amount of capital is valued at the time of establishment, making it difficult to determine the exact amount of capital.

17) Therefore, this study uses the operating margin which is the index of pure medical profit, subtracting the operating expense from operating income obtained by running a hospital. The operating margin is a key indicator of the hospital's most basic performance.

18) Operating margin is the value of medical profit divided by medical income. The operating margin is the net profit divided by medical profit and used as a profitability index. This is the most appropriate indicator in comparing the profits

and expenses as the existing studies also use as a measure of hospital profitability. 4), 19)

III. RESULT

3.1 Analysis of Revenues

TABLE 1. Income Statement per 100 Beds (Tertiary Hospitals in Metropolitans)

	Debit	Credit	Ratio
Patient Revenues		431281008	
Inpatient Revenues		258074482	59.839%
Outpatient Revenues		151662314	35.166%
Other Patient Revenues		21544212	4.995%
Gross Operating Expenses	418922377		
Personal Expenses	182561772		43.579%
Material Expenses	144177538		34.416%
Administrative Expenses	92173326		22.002%
Other Operating Expenses	9741		0.002%
Operating Profit		12358631	
Non-Operating Revenues		30636510	
Non-Operating Expenses	24138400		
Income Before Income Taxes		18856741	
Income Taxes	411713		
Transfers to Reserve Fund		1565356	
Net Profit	-1492178		

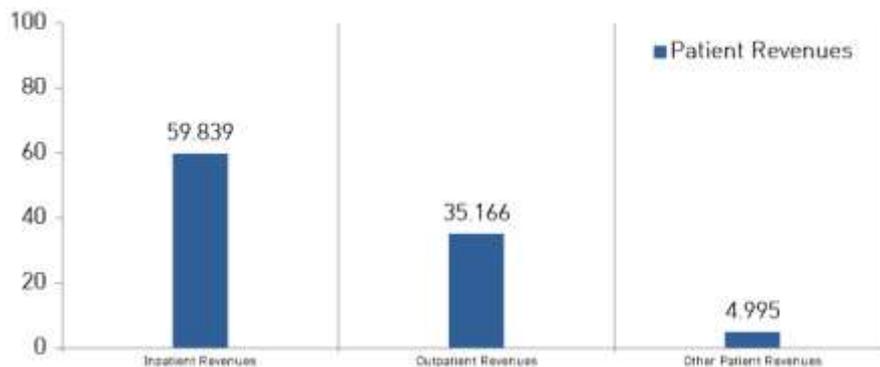


Figure 1. Ratio of Patient Revenues

TABLE 2. Analytics of Tertiary and hospitals with more than 300 Beds

	Tertiary	300 Beds+
Operating Margin	3.3	3
Net Profit to Gross Revenue	0.2	2.4
Value Added to Personnel Expenses	143.1	147.1
Ratio to cost ratio	97.1	97.6
Inpatient days	85.8	103.5
Monthly patient Revenues per 100 Beds(million won)	2664.7	1564.8
Number of employers per 100 beds	237.6	164.3
Number of doctors per 100 beds	50	26.9

For patient revenues, the inpatient revenues occupied by 59.839%, and the outpatient revenues took over 35.166% of the revenue while other numerous patient revenues resulted in taking only 4.995% of the total revenues. <Table 1>, <Figure 1>

As shown in the table, inpatient revenues are most important factor, as they occupy about 60% of the total revenue. However, there are 85.8 people per 100 beds while 300+ hospitals have 103.5 people per day. Although patient revenues are 2664.7 million, higher than that of 300+ beds resulted in 1564.8. According to other studies, the bed turnover rate influences the inpatient revenues, and days of hospitalization were found to be inversely proportional. Therefore, inpatient number and bed turnover rate are the major factors in profit. <Table 2>

There has been constant research on the ‘bed turnover rate’ having impact on the revenue. The higher in bed turnover rate has positive impact on the revenue. Many previous studies have shown a statistically significant negative relationship between average length of stay and operating margin. 3), 4), 6) 20) The longer the average length of stay, the less profitable the hospital, meaning that bed turnover rate is an important variable. In addition, the long-term hospital patients increase due to the increase of elderly population and increase of female employment. As the average life expectancy increases, the number of elder and their hospitalization rate is expected to increase, thus, it is highly important to have high rate of bed turnover. Hospitals can increase the bed turnover rate by linking patients who are no longer in need of care at tertiary hospitals, who have passed a certain period of hospitalization, such as terminal cancer patients nursing hospital and or community hospitals. This will also help to improve the finances of local hospitals suffering deficits due to the evasion of small and medium hospitals.

2. Also in order to increase the success rate of surgery, there is a need for high-tech diagnostic equipment and a system that can access surgical results with good clinical outcomes. In the last 30 years, 76,000 clinical case studies, which are an absolute criterion for understanding the effectiveness of treatment methods, have been published and nearly 10,000 clinical trials are published annually. 21). Although the chances of accessing these materials in Korea have improved compared to the past, the opportunity for individual physicians to use these outcomes in patient care is still limited. It is also one of the ways to provide doctors with a system that enables easily access to clinical case studies and clinical trial papers and to acquire medical knowledges. 12)

3. Furthermore, hospitals should be able to maximize other revenues such as revenues in emergency rooms. The deficit situation of emergency room is serious. There are many opinions for government to enforce emergency room restriction policy on a mild case patient. 22) The profitability of emergency surgery has dropped significantly and is a major cause for deficit formation. The emergency room is open for 168 hours per week. However, the health insurance corporation's treatment benefits to hospitals are reach only about 33-68% of the treatment expense. There are researches

showing that too low expense compensation rate(90% of outpatients) negatively impacts profitability. 22, 23) Also there are reports showing that 82% of patients who use emergency room are mainly the minor case patient who is discharged within 6 hours after visit. Since there is no hospital available at night or on holidays, the increase in the use of emergency room by non-emergency patients cause overcrowding in emergency rooms, making it difficult to provide effective services for patients with severe emergency, such as waiting for hospitalization and providing observation beds. This prevents emergency patients from getting adequate medical care. Even medical staff can be overworked with the burden on many patients. Therefore, consideration on outpatient treatment at night or on holidays may be taken. At present, anyone in Korea can go to the emergency room and receive treatment. It is also necessary to consider institutional arrangements to limit the use of emergency rooms by non-emergency patients and to receive outpatients. In addition, the activation of night and holiday watch duty for individual medical center can also be a one way. 1)

3.2 Analysis of Expenses

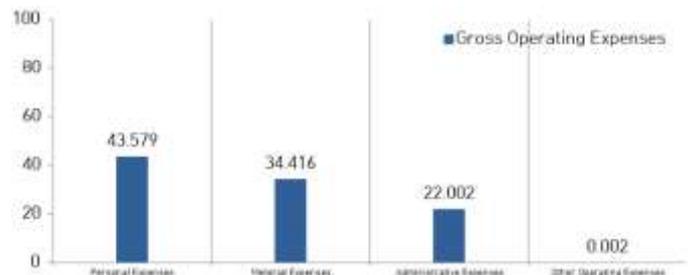


Figure 2. Ratio of Expenses

Average Gross Operating Expenses amounted 418,922,377,000 KRW.

Among them, personal expenses accounted for 43.579%, material expenses 34.416%, management expenses 22.002%, and other operating expenses at 0.002%. <Table 1> <Figure 2>

Monthly patient revenues per 100 beds for the tertiary hospital amount 2664.7 million won, which is much higher than 300+ hospitals of 1564.8million won. However, the medical profit margin for the tertiary hospital was 0.2, which is significantly lower than that of 300+ hospitals with 2.4. Therefore, the profit ration can be improved by reducing expenses. <table 2>

3.2.1 In particular, in terms of labor expense efficiency, tertiary was 143.1 compared to 300+, which was lower than 147.1. Therefore, labor expense investment efficiency needs to be increased. The personal expenses resulted the most for a single type of expense. In fact, another study showed that a 1% lower labor expense ratio increases the operating margin by 1.3 times (inverse of 0.767). 1) Therefore, the proper placement and maintaining the optimal number of doctors can lead to a reduction in labor expenses. This can be achieved by saving time efficiently through team treatment. For example, patients with complications should see doctors in various

fields. Team care saves time as patients do not have to see the doctors each separately, but able to see them all at once. This saves doctors time and increases the effectiveness of their care. Therefore, it can contribute to increase in labor efficiency and generate more profit. 17) 24)25) <table 2>

3.2.2 The expense of medical materials used during surgery or medical care accounts for about 34% of operating expenses. This is deemed necessary to reduce expenses through proper use instructions and care.

It is possible to apply a system that tracks usage by department by tracking material expenses in the operating room and materials used in the ward, so these data, it can be used to identify the room use consumables in real time.

3.2.3. Incentives for Drug Price Reduction: Most hospitals in Korea prescribe the original drug which is relatively expensive because patent period has passed, even if they have generic drug. Doctors cannot be blamed for the prescription of the drug for the original proven efficacy. However, due to recent advances in pharmaceutical technology, generic drugs with up to 99% of their efficacy are being produced. Like neighbors Japan, if hospitals purchase generic drugs from drug purchases, the Health Insurance Corporation may consider introducing a system that provides incentives to the hospital for one-half of the difference between the price of the original drug.31)

3.2.4 In addition, the results show that the type of establishment, labor expense ratio, management expense ratio, and per capita medical equipment investment expense had a significant impact on profitability. In this case, as the cost of medical equipment per capita increases, the medical profit ratio drops. 1) Thus, there is a way to increase profits by lowering the cost of medical equipment per specialist. According to other research results, in the turnover index of medical equipment, the deficit hospital group was 3.42 times, while the surplus hospital group was 6.28 times, and the cost of medical equipment investment per specialist was higher in the deficit hospital group. 4) Therefore, increasing medical equipment turnover effectively will lower the medical device costs and increases utilization, which will further improve profits.

3.2.5 The management expense accounted for 22.02% of the total cost. The management costs include welfare benefits, and the hospital management with labor-intensive medical services seemed to have a significant impact on employee productivity, but rather the effect of hospital benefits on management performance showed only to have a positive effect. However, it is significant that the issue of welfare benefits is expected to increase in the changing working environment, providing an opportunity to recognize this as an investment rather than a cost. 26)

IV. CONCLUSION

By analyzing profits and expenses through the income statement of 2016 tertiary hospitals in metropolitan, the research concluded that the revenues can be increased, and the expenses can be decreased. 27) Increasing the rate of hospital bed turnover could create a higher profit rate from inpatients, and various changes such as receiving outpatients to reduce

the deficit of emergency surgery, etc. can generate the profit and reduce the deficits. Also, in order to reduce the number of hospitalization days, successful surgical outcomes should be preceded. For this purpose, a method of easily accessing clinical outcomes and improving the success rate of surgery should be considered. As labor costs were the biggest factor to reduce of expenses, the research was concluded that the efficiency of labor costs and the cost of medical equipment per doctor can be lowered to increase hospital profit rate through cost reduction. In addition, improving the efficiency of management and operations also helps to reduce costs and increase profits, corresponding to current studies. 28) However, it is also possible to consider creating new sources of income through the diversification of medical services, such as expanding health check-up centers, foreign patient medical care, and changing of operating hours.

Firstly, health checkups consist of products ranging from 300,000 to 2 million won, including blood tests, and many items are not covered by health insurance, so the more patients who receive health check-ups, the more stable the hospital structure will be. The expansion of health examination centers will help improve the profitability of hospitals. 29)

Secondly, another way to improve the profitability of hospitals is to attract foreign patients. Since medical expenses for foreign patients are 1.5 times to 3 times higher than those for Koreans, many hospitals are currently trying to attract foreign patients.

Moreover, the profitability can be increased by increasing the operating hours flexibly. The treatment fee is fixed by health insurance, so is impossible to raise its price, but instead, hospitals are increasing operating hours to treat more patients. All the departments of Korea University Hospital and Samsung Seoul Hospital opens on Saturday to attract office workers and students who have difficulty visiting hospitals on weekdays, and also performs blood test and imaging test which are the main source of income. This will not only meet the demand for medical care but also help the hospital's profitability. 29) This research paper will help to improve the profitability and secure the financial health of the hospital by generating profits and reducing costs based on the analysis of the current hospital's profit and cost structure. Moreover, profitability improvement can be achieved through the diversification of medical services. Based on this revised profitability, hospitals will be able to reinvest in medical research, education, and facilities, and ultimately providing better health care services.

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