

# Comparison of Cost Benefit Analysis for Hyperbaric Oxygen Therapy and Magnetic Resonance Imaging in Surabaya PHC Hospital, Indonesia

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**Abstract-**The development of health care today more quickly and in its implementation requires health care institutions to continue to be able to read the direction of technological development and the needs and expectations of customers. This study aimed to calculate cost benefit analysis to be able to calculate how the business benefits of both types of these tools both hyperbaric oxygen therapy and magnetic resonance imaging. A cross sectional and descriptive study was conducted in Surabaya PHC Hospital. Collecting information through indept interview and analysis of secondary data. Ratio B/C of hyperbaric oxygen therapy is 1.35. Hyperbaric equipment procurement program to benefit over the next 10 years is still more than the cost. While NPV is Rp. 3884320452. Ratio B/C magnetic resonance imaging is 1.65. Magnetic equipment procurement program resonance imaging provide benefits over the next 10 years is still more than the cost. While NPV is Rp. 22,220,300,651. Cost Benefit Analysis is used to determine eligibility for the program based on the aspects of benefits and costs. Procurement of magnetic resonance imaging prioritized based on cost benefit analysis. However, if there is enough budget, then two procurement programs that were analyzed can be realized because it gives positive results.

**Keywords:** cost benefit analysis, medical equipment, cost-effectiveness, hospital

## 1. INTRODUCTION

The development of health care today more quickly and in its implementation requires health care institutions to continue to be able to read the direction of technological development and the needs and expectations of customers (1). Surabaya PHC hospital is currently located in the current competition between health care institutions, as well as in a position to have to continue to develop themselves, both in terms of quality of service and additional medical treatment modality. Some service development program is being reviewed to be determined whether it is feasible to be realized as a new service unit (2). Two of them are service hyperbaric oxygen therapy and magnetic resonance imaging diagnostic services. There has been a vendor who offers two types of tools related to the above. Deals for hyperbaric tool provided in the program, while for the magnetic resonance imaging apparatus, is given in the form of leasing deals.

Hyperbaric oxygen therapy services, has been used by some hospitals in Indonesia, but its population has not been much. Modality therapy with hyperbaric oxygen therapy is known to have managed to be able to improve the healing of wounds (wound healing). Hyperbaric oxygen therapy can be applied to parts of the body have swelling (edema) or infection. Hyperbaric oxygen therapy therapy is particularly widely used in patients with diabetes mellitus, who has a weakness, that is difficult to heal wounds, due to poor oxygen flow (perfusion) network in the peripheral blood stream. In addition to having benefits

in clinical therapy, hyperbaric oxygen therapy also has the potential benefit of a profitable business. Costs incurred is the cost of equipment investment, which in this Hyperbaric oxygen therapy tool service life can be up to 30 years with regular maintenance schedule and a very economical cost (3). As for the magnetic resonance imaging apparatus, today has become a very important diagnostic tool in the enforcement of patient diagnosis. Being a gold standard for some specific diseases, such as spinal disorder, stroke and many other diseases. In this paper, the calculation cost benefit analysis to be able to calculate how the business benefits of both types of these tools both hyperbaric oxygen therapy and magnetic resonance imaging (4).

## 2. METHOD

A cross sectional and descriptive study was conducted in Surabaya PHC Hospital. Collecting information through indept interview and analysis of secondary data. Analysis of benefits and costs to evaluate the use of economic resources available so that the resources can be put to good use. To then made a comparison between the activity of which is used to manage economic resources had to be used to generate a profit. The results of the calculation of cost benefit Analysis can later be used by the hospital management as the basis for the selection of eligible service provision for, realized in Surabaya PHC Hospital, whether it is hyperbaric oxygen therapy or magnetic resonance imaging diagnostic services.

### 3. RESULTS

#### 3.1 Cost Benefit Analysis of Hyperbaric Oxygen Therapy

**Table 1.** Measuring of cost benefit analysis of hyperbaric oxygen therapy

RATIO B/C P. Hyperbaric	1.35
Tot PV Cost	Rp. 11.083.230.334
Tot PV Benefit	Rp. 14.967.550.786
NPV= TOT PV BENEFIT - TOT PV COST	Rp. 3.884.320.452
IRR	18%

Table 2 illustrates that the ratio B/C Hyperbaric oxygen therapy is 1.35. Hyperbaric equipment procurement program to benefit over the next 10 years is still more than the cost, making this program feasible to do. While NPV is the difference between Total Total PV PV Benefit Cost is Rp. 3884320452, - means that within 10 years, this hyperbaric procurement program provides a positive profit projection above number.

#### 3.2 Cost Benefit Analysis of Magnetic Resonance Imaging

**Table 2.** Measuring of cost benefit analysis of Magnetic Resonance Imaging

RATIO B/C P. Magnetic Resonance Imaging	1.56
Tot PV Cost	Rp. 39.837.850.116
Tot PV Benefit	Rp. 62.058.150.767
NPV= TOT PV BENEFIT - TOT PV COST	Rp. 22.220.300.651
IRR	16%

Table 2 shows that the procurement magnetic resonance imaging in a ratio B/C of 1.65. Magnetic equipment procurement program resonance imaging provide benefits over the next 10 years (more than the cost), so the program is feasible to do. While NPV is the difference between Total Total PV PV Benefit Cost is Rp. 22,220,300,651,- means that within 10 years, the procurement program magnetic resonance imaging provides a positive profit forecast. In magnetic resonance imaging equipment procurement, NPV becomes large because the calculations are up to 10 years. Leasing payments to vendors just walk up to the fifth year. In the sixth year onwards has been no payment physiotherapy, tools belong Surabaya PHC Hospital so that all benefit from the sixth year can be an advantage for the hospital.

#### 3.3 Cost Benefit Analysis: Hyperbaric Oxygen Therapy Vs Magnetic Resonance Imaging

Comparisons between the two programs indicate that the provision of magnetic resonance imaging better aspect is the benefit (B/C ratio of 1.56 and has a NPV Rp.22.220.300.651,-). If there are limitations in the choice of programs for funding, then it can choose magnetic resonance imaging as a priority. If there are no limitations election because the funds are insufficient, then both the above program can be run, because a B/C ratio, all of which showed the results (B/C > 1).

### 4. DISCUSSION

Establishing the clinical effectiveness and cost effectiveness of medical devices relies on evidence which is often less extensive and lower in quantity than evidence (6). Cost effectiveness could be further improved by treating with hyperbaric oxygen therapy on an out-patient basis, rather than providing accomodation in the hospital (7). As for advantages, magnetic resonance imaging possesses higher distinguishing capabilities among the soft tissues of the brain and viscera as well as a better diagnostic ability for nervous system diseases. It also reduces the risk of radiation. Furthermore, magnetic resonance imaging operation not only enhances hospital reputation, but also improves the quality of medical treatment. As for disadvantages, the revenue generated from magnetic resonance imaging operation does not offset the high cost of purchasing the equipment (8). The medical equipment with a short cost recovery period had a high investment yield. There are many factors affecting the cost and profit of medical equipment, and scientific management may contribute to the maximal benefit with small investments (9,10).

### 5. CONCLUSION

Cost Benefit Analysis is used to determine eligibility for the program based on the aspects of benefits and costs. Procurement of magnetic resonance imaging prioritized based on cost benefit analysis. However, if there is enough budget, then two procurement programs that were analyzed can be realized because it gives positive results.

#### Acknowledgments

Thanks to the Chief of Surabaya PHC Hospital permission in conducting study.

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