

**ABC Analysis Towards Drug Needs Planning in Pharmacy Installation of RSUD Kota Yogyakarta In 2010**Heny Puspasari<sup>1\*</sup>, Sulanto Saleh Danu<sup>2</sup>, Endang Sulistyani<sup>3</sup><sup>1</sup>Department of Pharmacy, Academy of Pharmacy Yarsi, Pontianak<sup>2</sup>Centre of Study Pharmacology Clinic and Drug Policy, Gadjah Mada University, Yogyakarta<sup>3</sup>Pharmacy Installation of RSUD Kota Yogyakarta, Yogyakarta

\*Corresponding author: heny24puspasari@gmail.com

**Abstract**

**Background:** Consumption method is one of the standard methods which are used to plan the number of drugs need. This method provides good accuracy of the prediction toward the drug needs planning. However, this does not always provide satisfactory outcomes because this method cannot provide the outlook of the investment value toward each drug. To obtain a plan suitable to the need and purpose, drug planning can be analyzed using several methods; one of them is ABC analysis which is also known also as Pareto or Pareto Law 80/20, a method used in logistic management to classify goods into three based on the investment value, namely A with 75 - 80%, B with 15 - 20%, and C with 5 - 10%. **Objective:** To obtain the outlook about the process and the outcomes of the ABC analysis towards drug needs planning in Pharmacy Installation of RSUD Kota Yogyakarta in 2010. **Methods:** The data were collected by collecting and observing the secondary data in 2010, as well as carrying out some deep interviews to some related correspondences. **Results:** This research showed that the planning process is carried out by the Pharmacist in pharmacy supply sub-division and the correction carried out by the head of the hospital Pharmacy. Moreover, in the hospital there was no special planner team to plan the need of the drug, and there was no involvement from related parties. Drug item from group A has been prioritized. **Conclusion:** The planning that has been carried out so far was effective and efficient, as can be seen from the planning appropriateness with the highest occurring disease pattern in the hospital from each service unit.

**Keywords:** RSUD Kota Yogyakarta, planning, consumption method, ABC analysis

**INTRODUCTION**

RSUD Kota Yogyakarta was established to be a BLUD (Badan Layanan Umum Daerah Penuh – Local Public Service Agency) on 12 September 2007 with Mayor's Decision Number 423/KEP/2007 year 2007. It is expected that with BLUD status, the General Hospital of Kota Yogyakarta will become more flexible, efficient, and effective in providing health service for the people. The General Hospital of Kota Yogyakarta was established as Hospital Class B Non-Education on 28 November 2007 with Ministry of Health of the Republic of Indonesia Number 1214/MENKES/SK/XI/2007. By establishing the General Hospital of Kota Yogyakarta as Hospital Class B Non-Education, the organizational structure and job description are enhanced by the regulation made by the Mayor of Yogyakarta Number 9 of 2008 about the establishment, structure, position, and the main obligation of local technical agency already suited to the Government Regulation Number 41 of 2007. The

name of RSUD Wirosaban Yogyakarta was changed into Yogyakarta Hospital. The change of the name was established by the Mayor through Yogyakarta Mayor Decision (*Kepwal*) Number 337/KEP/2010 (RSUD Kota Yogyakarta, 2010). It is expected that with BLUD status, General Hospital of Kota Yogyakarta will become more flexible, efficient, and effective in providing health service to the people (Clevert *et al.*, 2007).

So far, RSUD Kota Yogyakarta has been using the consumption method for the drug planning in order to supply drugs in the hospital to fulfill all the drug demands, the plan is carried out by each unit in the hospital, and then the plan is recapitulated by the pharmacist of pharmacy store room, which is next corrected by the head of the Hospital Pharmacy. However, so far at RSUD Kota Yogyakarta the evaluation has not been carried out based on the plan and needs of drugs, and there is a shortage of some

drugs. Moreover, the hospital noted that the number of prescriptions that could not be served is around 3.29%.

The plan that has been made is supposed to be evaluated using ABC value analysis method in order to be able to make corrections on the economic side because one type of drug can take up a big budget, which can be caused by frequent use or high prices of drugs. By using ABC value analysis, the types of the drug can be detected, starting from drug groups which need the biggest share of the budget, or measure the types of the drugs that have to be prioritized by considering the budget used to purchase those drugs (Quick *et al.*, 1997).

ABC analysis, which is also well-known as Pareto analysis or Pareto Law 80/20, is one of the methods used in logistic management to classify a group of goods into three groups (group A, B and C). Group A contains goods with 10 - 20% of all items, but it has investment value around 75 - 80% from the total investment value. Group B contains 10 - 20% of all goods, but their investment value is around 15 - 20% from the total investment value. Group C contains 60 - 80% of the items, but their investment value is 5 - 10% from the total investment value. By classifying goods into these groups, managing each of these groups can be easier. Thus, the planning process, physical control, supplier ability, and decreasing the big stock safety can reach an optimal level (Halloway & Green, 2003).

The implementation of BLUD system in health service of RSUD Kota Yogyakarta includes no evaluation on drug needs planning, whether using ABC method, VEN (Vital Essential Non-essential), or revision methods of drug list. Considering this, the research conducted the evaluation on drug planning at RSUD Kota Yogyakarta by seeing the pattern aspect indicators of top 10 diseases, the amount of patient visitations and drug budgets using ABC analysis, which is one of the instruments used to evaluate the drug needs planning. The ABC analysis, can measure whether the plan that is carried out so far is effective, efficient, and fits to the need or not, seen from the appropriateness indicator with the top disease pattern. Furthermore, it can find out the drug priority to fulfill the need of drugs at RSUD Kota Yogyakarta.

## METHOD

This research was an analytic descriptive research with case study framework to obtain the description about the drug planning process at the Hospital Pharmacy of RSUD Kota Yogyakarta. The data were obtained through collecting and observing the secondary data in 2010, including: 1) the data of top 10 diseases from 3 unit services of *Reguler*, *Askes*, and *Maskin*. *Maskin* patients are the patients paid for by government budget. *Askes* patients are insured patients affiliated with the hospital, while regular patients are self-paying; 2) Work Unit Budget Document (*Dokumen Anggaran Satuan Kerja – DASK*); 3) drug expenses; 4) income document of the hospital and drugs, the list of drug planning in 2010. The primary data were obtained from observation result and in-depth interview with the Director of RSUD Kota Yogyakarta, the head of Hospital Pharmacy, the Vice-Director of Public Affairs and Finance, the Section Chief of Service Support, the Responsible Pharmacist of the Pharmacy's Supplies, and the Pharmacy and Therapeutic Unit Secretary.

The results of the study are in the form of recommendation of drug items in the drug planning of RSUD Kota Yogyakarta by using ABC analysis, which can be used as the basis of arrangement of the drug needs planning at RSUD Kota Yogyakarta. Group A that has investment value 80% from the total budget of drug planning is supposed to be planned optimally, so the plan could be effective and efficient based on the disease patterns mostly found in the hospital.

## RESULTS AND DISCUSSION

### The description of top 10 disease patterns

The disease patterns found at RSUD Kota Yogyakarta in 2010 as follow:

#### 1. Outpatient disease pattern

Below is the description of the top 10 outpatient diseases at RSUD Kota Yogyakarta in 2010

#### 2. Disease pattern of inpatients

Below is the description of disease pattern of inpatients at RSUD Kota Yogyakarta in 2010 (Table 1).

**Table 1.** Top 10 Diseases of outpatient and midwifery services at RSUD Kota Yogyakarta in 2010

Rank	Regular Patients		ASKES Patients		MASKIN Patients	
	Disease	No of Patients (%)	Disease	No of Patients (%)	Disease	No of Patients (%)
1	Fever, unspecified	1190 (16.14%)	DMT2 without complication	8954 (41.15%)	DMT2 without complication	1423 (20.9%)
2	Acne vulgaris	1156 (15.68%)	Essential hypertension (primary)	3130 (14.39%)	Stroke Infark	993 (14.58%)
3	Supervision of normal pregnancy, unspecified	849 (11.51%)	Presbyopia	1611 (7.4%)	Congestive heart failure	697 (10.23%)
4	Cerumen Impact	810 (11.98%)	Others artrosis	1495 (6.87%)	Chronic ischaemic heart disease, unspecified	594 (8.72%)
5	General Examination and Investigation without Complaint	739 (10%)	DMT1 without complication	1405 (6.46%)	Supervision of normal pregnancy, unspecified	589 (8.65%)
6	Injuries	573 (7.7%)	Stroke Infark	1385 (6.36%)	Epilepsi	585 (8.59%)
7	Necrosis of pulp	568 (7.69%)	Chronic ischaemic heart disease, unspecified	1169 (5.37%)	Essential hypertension (primary)	506 (7.43%)
8	Cough	530 (7.18%)	DM non-dependent insulin	973 (4.47%)	Low back pain	494 (7.25%)
9	Konvalesen	505 (6.85%)	Low back pain	911 (4.19%)	Heart disease	478 (7%)
10	The others extreme otitis infection	453 (6.14%)	Myopia	726 (3.34%)	Others artrosis	451 (6.62%)

From the table above, it can be seen that the most occurring disease of outpatient patients in 2010 from *askes* and *maskin* patients is insulin-independent DM without complications. The disease mostly found in regular patients is unspecified fever. The diseases mostly found are hypertension, stroke, arthrosis,

supervision of normal pregnancy, CHD, DMT2 without complication, presbyopia, and cerumen impact. The numbers of each patient categories were 7373 for Regular patients, 21759 for *Askes* patients, and 6810 for *Maskin* patients.

**Table 2.** Top 10 Diseases of inpatient and midwifery services at RSUD Kota Yogyakarta in 2010

Rank	Reguler Patients		ASKES Patients		MASKIN Patients	
	Disease	No of Patients (%)	Disease	No of Patients (%)	Disease	No of Patients (%)
1	Dengue hemorrhagic fever	363 (21.57%)	Dengue hemorrhagic fever (DHF)	68 (13.44%)	Exceptional large baby	264 (21.45%)
2	Dengue fever	272 (16.16%)	DMT2 without complication	63 (12.45%)	Single spontaneous delivery, unspecified	240 (19.50%)
3	Acute Gastroenteritis	242 (14.37%)	Dengue fever (classic dengue)	57 (11.27%)	Dengue hemorrhagic fever (DHF)	168 (13.65%)
4	Single spontaneous delivery, unspecified	177 (10.52%)	Acute Gastroenteritis (diarrhea, colitis, enteritis)	53 (10.47%)	Caesarae section, unspecified	140 (11.37%)
5	Acute upper respiratory infection, unspecified	155 (9.3%)	Essential hypertension (primary)	53 (10.48%)	Normal birth	104 (8.44%)
6	Exceptional large baby	151 (8.97%)	Acute myocardial infarction, unspecified	47 (9.29%)	Dengue fever (classic dengue)	94 (7.64%)
7	Fever, unspecified	127 (7.55%)	Fever, unspecified	46 (9.09%)	Acute Gastroenteritis (diarrhea, colitis, enteritis)	81 (6.58%)
8	Delivery by caesarae section, unspecified	68 (4%)	Single spontaneous delivery, unspecified	46 (9.09%)	Stroke	63 (5.12%)
9	Normal birth	66 (3.93%)	Exceptional large baby	40 (7.9%)	Essential hypertension (primary)	42 (3.41%)
10	Bacterial infection, unspecified	62 (3.68%)	Disorder of urinary system, unspecified	33 (6.52%)	Fever, unspecified	35 (2.84%)

From the Table 2, it could be seen that the disease of inpatients mostly found in *askes*, regular and *maskin* patients was dengue fever (DHF). The other diseases that were found were diabetes mellitus, hypertension, stroke, unspecified spontaneous birth, childbirth, gastroenteritis, unspecified fever, caesarean section, and unspecified bacterial infection. Numbers of each category of patients were 1683 for Regular patients, 506 for *Askes* patients, and 1231 for *Maskin* patients.

#### Human resources

The availability of Human Resource in planning drug needs is very important in an organization. To support the fluency of the organization, the hospital needs sufficient employees from the aspects of quantity, competency, and equality.

Human Resources available in Hospital Pharmacy RSUD Kota Yogyakarta consist of 7 pharmacists and 17 pharmacist assistants, in addition to 4 administration workers. The Human Resource criteria in Yogyakarta Hospital has fulfilled the criteria established by the Depkes RI (2006), which consists of pharmacist and pharmacist assistants.

#### Budget

Budget is one of the important aspects in the continuity of an organization, including the Hospital Pharmacy that needs budget support to carry out the activities. From the results of this study, it was shown that budget for the need of RSUD Kota Yogyakarta has fulfilled the need of drug expenses. Based on the interview with the Director of RSUD Kota Yogyakarta and the Vice Director of Public Affairs and Finance, it

was found that the budget for drugs so far never had a shortage and the budget for pharmacy supplies infrastructure needs to reach more than 40% from the total of hospital budget. Nevertheless, if the Hospital Pharmacy asked additional budget to purchase drugs, it could be fulfilled as it meets the requirement that the income obtained from drugs has stayed higher if compared to the expenses spent for drugs. The ability of additional budget is also considered. If it is more than the budget that had been planned in this year, then it would be put to the expense budget of the next year.

This study showed that the understanding of the decision makers on budget for the need of pharmacy supplies infrastructure had become better for the years 2007 - 2010. Based on WHO (2002), drug expense is one of the biggest parts of the health budget; in some developed countries is around 10 - 15% from the health budget. However, while in developing countries the budget is around 35 - 66%. Based on Quick *et al.* (1997), developing countries the drug expense is the second largest budget after salary, which is 40% from the whole hospital budget.

#### **Medical service standard**

The Medical Service Standard of RSUD Kota Yogyakarta made by each of pharmacy management unit in the hospital cooperating with medical committee and Pharmacy and therapy unit in the year 2006 has been established based on the revision in 2010. The medication standard consists of 11 books about internal disease, pediatric, obstetric, neurology, psychopathic, otolaryngologic, eyes, skin and venereal, dental and oral, and emergency.

According to Hartono (2007), after the implementation of medical service standard, the total budget of the treatment service in elective section Caesarea action at RSUD Budhi Asih increased by 63,822 Rupiahs on average; however, the budget variation as whole decreased significantly.

#### **Management information system**

Hospital Pharmacy of RSUD Kota Yogyakarta has been using the computerization system as the management information system. Although the drug data management from ordering, goods spending, recapitulating of the drug usage, etc. has been computerized, there is no specific software used to manage the data. According to Quick *et al.* (1997), specific computerization program for drug management is often used to measure the need of drugs, supply, inventory management, or the drug usage analysis. Drug information increases with electronic communication system.

#### **Formulary**

The formulary of RSUD Kota Yogyakarta was made by Pharmacy and therapy unit in 2004 and in 2008 there was a revision and until the present it is still in the second revision process. This was appropriate with the results of the interview with the Pharmacy and therapy unit Secretary, who stated that the formulary was still in revision.

The prescription percentage outside the formulary in outpatient installation during April - December 2010 reached an average value of 8.28%. This shows that the appropriateness in prescribing with the formulary was still weak in influencing the drug planning in hospital because formulary is supposed to be used as reference in drug planning.

The hospital's formulary is the list of drugs compromised along with the information that is supposed to be established in hospital arranged by the Pharmacy and Therapy Team and Hospital based on DOEN. A hospital's formulary has function to provide information about drugs used by hospital. Thus, it is obvious that formulary is used as reference in planning the usage of drugs in hospital (Depkes RI, 2008).

#### **Pharmacy and therapeutic unit (PTU)**

From the results of the study, it can be seen that Pharmacy and therapeutic unit had been implementing the duties and functions as they are supposed to be. However, the drug planning arrangement was still carried out only by Hospital Pharmacy through Pharmacist in pharmacy supply sub division and there is no special team yet in the planning process and the responsibility from the member of Pharmacy and therapy unit was only in the selection process, which was later put in the hospital formulary.

In arranging the drug planning, the Pharmacy and therapeutic unit are supposed to be involved in the process because the Pharmacy and therapy unit are organizations the coordination between medical staff and pharmacy staff (Suciati & Adisasmito, 2006). Before the drug planning is made, the drugs that will be supplied by hospital is supposed to be consulted first by the management, pharmacists, and physicians through the Pharmacy and therapeutic unit (Maimun, 2008).

#### **Drug planning system carried out in Hospital Pharmacy of RSUD Kota Yogyakarta in 2010**

Planning is the activity process in choosing the types, quantities, and prices of drugs, which is based on needs and budget. According to the interview with the head of Hospital Pharmacy, the method used so far in Hospital Pharmacy RSUD Kota Yogyakarta is

consumption method, and it has never been evaluated especially in drug planning, whether with ABC method or by other methods, although the hospital status is BLUD.

The planning is carried out by the Pharmacist in pharmacy supply sub division by considering the consumption data from the previous months that measured each item of drugs and then associate them to the disease patterns and the development of hospital. It is also considered based on the budget and remnant stock. The planning is carried for monthly consumption and the need per year. The head of Hospital Pharmacy conducts final correction after the planning is made, but the drug priority has not been considered yet. The consumption method is one of the planning methods

that is very popular and mostly used. Planning is one of the early steps of the drug management that is supposed to be written down. The written plan will ease the coordination between budget supplier and the usage of drug, so the budget for drug supplies can be optimized.

**ABC analysis**

**Maskin unit**

The results of ABC analysis on the drug needs planning in *maskin* units include: the number of the items, the percentage of the items, value, and percentage, as well as ten drugs with highest investment value per year in a *maskin* unit. The results can be seen in Table 3 as follows:

**Table 3.** ABC analysis from *maskin* unit at RSUD Kota Yogyakarta April - December 2010

Item	A	B	C	Number of Quantity
Number of the Item	25	41.75	100.2	167
Item Percentage	15%	25%	60%	100
Value in Rp.	792,643,950	151,098,447	51,090,503	994,832,900
% Value in year	80%	15%	5%	100%

Data Source: Secondary data in 2010 that has been processed

From the research, it can be seen that in *Maskin* unit, the investment budget of the group A was 80%, while group B used 15% from the total investment budget. The amount of the drug items for each unit showed that group A amounted to 10 - 20%, group B reached more than 10 - 20% from the whole drug items that were available. This shows that the budget planning in *Maskin* unit had shown the efficiency. The biggest part of the budget was invested for drugs from group A with the investment budget of 80%, so those drugs required specific attention in planning price and in controlling the availability of the drugs. Based on research conducted by Suciati & Adisasmito (2006), it was shown that the investment value of groups A and B used 90% of the investment, so specific attention is required to control the availability of those drugs. The stock for both groups is supposed to be forced to be as low as possible, but the purchasing frequency is carried

out often, just like how often it was done, which was weekly. However, a good cooperation with the suppliers is supposed to be taken into account, so the ordering process can be fulfilled on time, ensuring there is no lack of drug.

Types of drugs from ABC analysis for *Maskin* unit showed that the planning was effective. Most of the drug planning in *Maskin* unit from group A were used for one of the therapies for the top 10 disease at RSUD Kota Yogyakarta, such as diabetes mellitus, which depended on the availability of insulin or Oral Anti Diabetes Drugs (Novorapid®, Novomix®, Glurenorm® and Glucobay 50®).

**Regular unit**

The number of items, item percentage, value and value percentage per year in regular unit can be seen in the Table 4 as follows:

**Table 4.** ABC analysis from regular unit at RSUD Kota Yogyakarta April - December 2010

Item	A	B	C	Number of Quantity
Number of item	142.8	214.2	357	714
Item Percentage	20%	30%	50%	100
Value in Rp	2,292,439,304	433,373,207	144,089,454	2,869,901965
% Value in year	80%	15%	5%	100%

Data Source: Secondary data in 2010 that has been processed

From the result of the ABC analysis in Regular unit, it was found that that group A used 80% investment budget and group B used 15% the investment budget from the total investment budget. The number of drug items showed that group A reached 20%, group B reached more than 10 - 20%, and group C reached less than 60 - 80% out of all drug items that were available. It was shown that the planning processing Regular unit shows that the drug budget was used efficiently, whereas most of the budget had been invested to drugs from group A.

Similar with *Maskin* Unit, the biggest part of the Regular Unit planning was for drugs from group A which was used for therapy from the top 10 diseases mostly found at RSUD Kota Yogyakarta, such as bacterial infection or antibiotic drug type which

consists of several types of drugs, including Anbacim® inj, Cefixim®, Levocin® inf, Mosardal® inf, and Sulbacef®. The other drugs were from proton pump inhibitor, anti-hypertension, anti-platelet, anti-vertigo, anti-nausea, treatment for post-trauma shock and so on.

Based on research by Maimun (2008), the classification of antibiotic by using ABC analysis found that there were 15 items of antibiotic, with average usage of  $\geq 200$  per month. This means that there were 15 antibiotic mostly used each month that was categorized by the researcher as fast moving antibiotic.

**Askes unit**

The number of the item, item percentage, value and value percentage per year in *Askes* unit can be seen in the Table below:

**Table 5.** ABC analysis from *askes* unit at RSUD Kota Yogyakarta April - December 2010

Item	A	B	C	Number of Quantity
Number of item	63	91	210	364
item percentage	17.3%	25%	57.7%	100
Value in Rp	3,580,242,660	676,333,109	227,028,263	4,483,604,032
% Value in year	80%	15%	5%	100%

Data source: Secondary data in 2010 that has been processed

From this research, it was found that in *askes* unit group A used 80% and group B used 15% the investment budget from the whole investment budget. The number of drug items for each unit showed that group A reached 10 - 20% items, group B reached more than 10 - 20%, and group C reached less than 60 - 80% out of the drug items that were available. It is shown that planning in the *Askes* unit was efficient, because most of the budget was invested to drugs from group A, the drugs that required specific attention in planning and controlling the availability of drug items.

Group A drugs with 80% value of the investment should not run out since it affects the effect of therapy on patients. The number of drug items might be small, but the frequency of ordering is more frequent and because the value of the investment is large enough for the hospital this requires strict supervision and drug monitoring by the head of the pharmaceutical installation.

Group B drugs with 10 - 20% value of the investment, are still tolerated if there is a delayed butno more than 24 hours by reducing the frequency of ordering i.e. every two weeks. Supervision and monitoring of this group can be loose. Group C category of drugs with lower of value investment can be tolerated if there is a delayed till more than 24 hours. The frequency of ordering can be less often

based on the needs and funds available i.e. for example once a month.

The types of drugs from ABC analysis for *Askes* Unit show that the planning was effective since most of the drug planning in *askes* unit was for drugs from group A, which were used for one of the therapy from top 10 diseases mostly found at RSUD Kota Yogyakarta, such as diabetes mellitus that depends on the usage of insulin or not, like novorapid, novomix, glurenorm, and glucobay 50. The other drugs include like valsartan for hypertension therapy, Vaclor for stroke therapy, and so on. These results were similar with the research conducted by Sukminingrum (2006), which showed out of all drug tablet items that were most prescribed, it could be seen that the drugs were mostly used showed the investment value from the whole drug planning budget that was not really high, except for drugs for anti-diabetes and anti-hypertension.

From a number of similar studies conducted previously, for the classification of drugs using ABC analysis it is very appropriate to prioritize procurement and supervision of drug use, so that it is more efficient and effective, especially for hospitals that have limitations in budget and human resources. The number of drug items in planning also need to be considered. The drugs in group C which reaches 50 - 60% can be simplified by reducing the drug items

with the different trade names but same therapeutic effects. For this reason, the roles of the Pharmacy and therapeutic unit in preparing drug standardization are needed.

## CONCLUSION

From the result of ABC analysis on the drug needs planning in Yogyakarta Regional General Hospital in 2010, the following summary can be made:

1. The drug needs planning system in Hospital Pharmacy used consumption method with the planning process carried out by Pharmacist in pharmacy supply sub division and corrected by the head of the Hospital Pharmacy.
2. ABC analysis towards three service units that consisting of *Maskin*, Regular, and *Askes* units in Hospital Pharmacy of RSUD Kota Yogyakarta revealed that the investment value from the drug usage value from each group were as follows: Group A with 80% of drug items reached 20%, Group B with 15% of items amounted to > 20%, and Group C with 5% of drug items amounted to < 60%; the research found that drug item group A is the one that is prioritized.
3. The appropriateness of the pattern of top 10 diseases with the results of ABC analysis in each service unit showed that the planning that has been done so far has been effective and appropriate with the top 10 diseases patterns mostly found in hospitals.

## REFERENCES

- Clevert, D. A., Stickel, M., Jung, E. M., Reiser, M., Rupp, N. (2007). Cost Analysis in Interventional Radiology--A Tool to Optimize Management Costs. *European Journal of Radiology*; 61; 144-149.
- Departemen Kesehatan RI (Depkes RI). (2006). Standar Pelayanan Farmasi di Rumah Sakit. Jakarta: Direktorat Jenderal Bina Kefarmasian dan Alat Kesehatan.
- Departemen Kesehatan RI (Depkes RI). (2008). Pedoman Pengelolaan Perbekalan Farmasi di Rumah Sakit, Direktorat Jenderal Bina Kefarmasian dan Alat Kesehatan Departemen Kesehatan RI Bekerjasama dengan Japan International Cooperation Agency. Jakarta: Departemen Kesehatan RI.
- Halloway, K. & Green, T. (2003). Drug and Therapeutics Committees. Arlington: WHO Management Sciences for Health.
- Hartono, J. P. (2007). Analisis Proses Perencanaan Kebutuhan Obat Publik untuk Pelayanan Kesehatan Dasar (PKD) di Puskesmas Se Wilayah Kerja Dinas Kesehatan Kota Tasikmalaya, *Tesis*; Magister Ilmu Kesehatan Masyarakat Konsentrasi Administrasi Kebijakan Kesehatan Program Pascasarjana Universitas Diponegoro, Semarang.
- Maimun, A. (2008). Perencanaan Obat Antibiotik Berdasarkan Kombinasi Metode Konsumsi Dengan Analisis ABC dan Reorder Point Terhadap Nilai Persediaan dan Turn Over Ratio di Hospital Pharmacy RS Darul Istiqomah Kaliwungu Kendal. *Tesis*; Magister Ilmu Kesehatan Masyarakat Konsentrasi Administrasi Rumah Sakit Program Pascasarjana Universitas Diponegoro, Semarang.
- Quick, J. D., Rankin, J. R., Laing, R. O. & O'Connor, R. W. (1997). Managing Drug Supply: The Selection, Procurement, Distribution and Use of Pharmaceuticals (Fourth Edition). West Hartford: Kumarian Press.
- RSUD Kota Yogyakarta. (2010). Buku Profil Rumah Sakit Umum Daerah Kota Yogyakarta Tahun 2009. Yogyakarta: RSUD Kota Yogyakarta.
- Suciati, S., & Adisasmito, B. (2006). Analisis Perencanaan Obat berdasarkan ABC Indeks Kritis di Instalasi Farmasi. *Jurnal Manajemen Pelayanan Kesehatan*; 09; 19-26.
- Sukminingrum, N. (2006). Evaluasi Perencanaan dan Penggunaan Obat di Rumah Sakit Universiti Sains Malaysia *Tesis*; Magister Ilmu Kesehatan Masyarakat Minat Utama Manajemen Rumah Sakit Program Pascasarjana Universitas Gadjah Mada, Yogyakarta.
- WHO. (2002). Buku Panduan Peserta Pelatihan Pengelolaan Obat pada Divisi Kesehatan dan Perkembangan Anak Genewa (terjemahan). Jakarta: Badan POM RI.