



Public Health Center (Puskesmas) Efficiency Level In Semarang Regency Year 2014

Eko Setiawan^{1✉}, Y. Titik Haryati²

¹PT. Djarum, Indonesia

²Economics Development Department, Economics Faculty, Universitas Negeri Semarang

Article Info

Article History:
Received April 2017
Accepted Juny 2017
Published Agust 2017

Keywords:
DEA, Efficiency, Public
Health Centers.

Abstract

Public health centers is a technical implementation unit of Local Health Department which is responsible for conducting health efforts for the whole society and as a first-rate health services that directly reach the whole community to achieve a healthy and prosperous society. The purpose of this study is to determine the ability of Community Health Center in managing the resources and how wide the coverage range of the Community Health Centre in district of Semarang. This study using variable input and output. The input which is used is consisting of four variables, they are: the number of medical personnel, the number of non-medical personnel, financing sourced from regional government budget and the number of integrated service post.. While the output variables are the health services towards toddlers, the immunization coverage, the number of outpatient visits and coverage of births assisted by health personnel. The data used was secondary data obtained from Local Health Department in district of Semarang, Central Bureau of Statistics and other sources. From the calculation of DEA, the results are, in 18 Community Health Centers are technically efficient and 8 Community Health Centers are technically inefficient. Unit public health centers that have efficient will be comparison for puskesmas that not efficient. For public health centers inefficient technically can improve efficiency value by raising output based on the calculation on DEA. Suggested the results of the efficiency with the dea can be used as an alternative to assess the efficiency of public health centers in kabupaten semarang regularly and as one input to assess, monitor and improved performance public health centers.

INTRODUCTION

According to Law Number 36 Year 2009, health is a human right and one of the elements of welfare that must be realized in accordance with the idea of Indonesian nation in sense of Pancasila and the Constitution of the Republic of Indonesia Year 1945. The purpose of health development is to improve the health status which in the future is expected to be a tool for development and empowerment of human resources that can be used as capital to realize the national development completely. Social, knowledge, and belief networks co-evolve, groups and organizations are treated as complex systems to capture the variability of human and organizational factors (Carne, et al., 2015)

Health programs should be seen as comprehensive strategies to improve the social and economic welfare of a population. Those strategies need chosen programs that can improve health status efficiently. For example, by developing health service networks, clean water infrastructure, improving public nutrition, immunization, etc. (Lubis, 2009).

According to Tjiptoherijanto and Soesetyo (1994), the discussion on health economics is more focused on health services rather than its own health. In economics view, this is important considering that economics will always lead to demand, supply and distribution of commodity which is health service, not its own health. Some public health initiatives are inherent in the blood center, such as providing human immunodeficiency virus educational material, whereas other initiatives have been actively created, such as cardiovascular screening, as a means to increase blood donor rates and increase the blood center's community interaction (Shaz, et al., 2012)

There are several public health service institutions in Indonesia, such as hospitals, polyclinics and Puskesmas. Public health service or known as Puskesmas is one of technical implementation unit of Health department which is responsible to provide health for all levels of society and also as the first level of health service. Moreover, it is a health facility that directly

affects and becomes the spearhead in realizing a healthy and prosperous society. In addition to perform curative functions, it also has a role in preventive and promotive activities, which can be seen from the 3 functions of Puskesmas as stated in the Minister of Health Decree No. 128 / Menkes / SK / II / 2004 about Puskesmas based policy, that is the booster center of development and health conception, the center of family and public empowerment, and the first strata health care center.

Quantitatively, Puskesmas is health facility whose distribution is most equitable rather than other health facilities. It is established to provide basic, comprehensive, plenary and integrated health services for all residents living within scope of its work. Indeed, Puskesmas' performance in Indonesia is still less than optimal. It is caused by the weakness of its organization and management and also the support of its resources. Little information is available on how federally funded health centers organize and provide family planning services (Goldberg, et al., 2015)

However, Puskesmas is often faced with several obstacles such as the number of Puskesmas that has not been equal yet to the population, its human resources which is still minimal, unequal health workers among Puskesmas, poor service, inadequate facilities, lack of operational and program funds, limitedness of medicine and other supporting medical equipment both types and quantities.

In this autonomy era, the management of Puskesmas is handed over to their respective local governments, so that they have full authority to manage it and determine the needs and placement of health workers in the region. Yet in fact, there are appointment and placement of health workers which are not in line with Indonesia Ministry of Health's policies.

Particularly, the performance Puskesmas management is measured by 2 (two) main conceptions, namely efficiency and effectiveness. If the efficiency focuses more on the process of utilizing, saving, and empowering resource inputs, so the effectiveness will focus more on the output and outcomes or results of expected

Puskesmas' performance. In other word, efficiency relates to relationship between input and health services with the resources used to produce output and outcomes (Handoko, 2003; in Razali, 2012).

Puskesmas is a non-profit oriented public service agency, although it should still prioritize the effectiveness and efficiency of the budget as most of its expenditures are still funded by APBD. Consequently, the performance assessment, both financial and non-financial still need to be implemented so government knows the effectiveness and efficiency of the use of funds, the development of Puskesmas itself, and the development of community service.

Health problems will affect the household economy both directly and indirectly. Another thing related to that is being ill will indirectly increase the cost of households for medical expenses, loss of working time and productive assets. Furthermore, illness can also lead to the decreased public welfare. It will retard or even reduce the rate of economic growth. Regarding to above explanation, the high morbidity rate will reduce productivity, the decline of investment in the business world and the reduction of productive human resources

Table 1. The Number of Puskesmas and Its Doctors Ratio per 10000 residents in 5 Regencies/Cities with Highest PDRB ADHB in Central Java Year 2014

No.	City/Regency	The Number of Puskesmas	Ratio of General Doctor in Puskesmas
1	Semarang Regency	26	7.64
2	Semarang City	37	7.25
3	Kudus Regency	19	6.70
4	Banyumas Regency	39	3.89
5	Cilacap Regency	38	2.03

Source: Central Bureau of Statistics of Central Java 2015.

The ability of Puskesmas in resource management reflects its efficiency level. To find out how big the coverage of Puskesmas' service in Semarang Regency can be calculated by comparing actual service activities which have been conducted by Puskesmas with output indicator that reflects the level of achievement of every health service activity program. Puskesmas in Semarang regency has the highest ratio of doctors compared to 4 other areas, which is 7.64 (rounded to 8). It means that every 8 doctors in Semarang regency is assigned to provide services for 100,000 residents.

To assess the achievement of Puskesmas' performance is not only looking at the above input indicators, but we should also look at the output indicators. There are several sub output indicators in Public health service, namely Infant Mortality Rate (IMR).

Table 2. The Number of Infant Mortality in 5 Regencies/ Cities with the Highest PDRB ADHB in Central Java Province Year 2014

No.	Regency/ City	Infant Mortality Rate per 1000 life births
1	Kudus Regency	8
2	Banyumas Regency	9
3	Semarang City	9
4	Cilacap Regency	9
5	Semarang Regency	10

Kabupaten Semarang has the highest IMR of 10 babies dying in every 1000 births rather than 4 other areas. IMR describes the level of public health problems related to factors which cause infant mortality, antenatal care level, maternal nutritional status, the success rate of KIA and family planning programs or KB, and environmental and socioeconomic conditions. In other words, if the IMR in a region is high, its health status is low.

At the national level, the level of achievement is stipulated in Regulation of Minister of Health No. 741 / MENKES / PER / VI / 2008 on Minimum Service Standard for Health Sector in Regency / City. Puskesmas that reaches the target of service means able to

manage resources well so that it can organize activity program maximally. The ability of resource management reflects the efficiency level of Puskesmas. Efficiency is the ratio of output and input. In general, a unit is efficient if it uses fewer inputs than other units, but it can achieve the same output with other units, even larger.

Afterwards, to sort the efficiency of Puskesmas, it is necessary to have a benchmark that is Puskesmas which has the best efficiency can be used as based reference in calculating the efficiency value of Puskesmas and another.

RESEARCH METHOD

This study used a quantitative approach with Data Envelopment Analysis (DEA). It was used as a method of analysis of this study because DEA is a non-parametric approach which is basically linear programming based technique that can accommodate one-unit of different input and output variables and directly compare the efficiency of each Decision Making Unit (DMU).

Furthermore, this study used data collection method namely library research method. It was done by collecting data which was obtained from district health office, Puskesmas, Central Bureau of Statistics, health profile of Semarang Regency, and several books and literature either in the form of research journal or publication of government performance report related to this study.

DEA model used is a model that maximizes the output value (output maximizing), namely DEA BCC (VRS) Model. This model was used if we assumed that the comparison toward the input or output of a company/ organization would affect the productivity that might be achieved, namely VRS (Returns to Scale variable). This study used output maximizing model, because when the writer used maximizing input, the achievement of efficiency of Puskesmas would be difficult to get. For instance, input approach to the budget variable. Preparation of government budget allocations required long and long-term processes as it was requires to approval of the people's parliament and the availability of budgets in each

region. Thus, for Puskesmas, the budget input cannot be fully controlled.

The BCC model with input-output oriented for DMU can be written by:

$$\text{Maksimisasi} \rightarrow h_s = \frac{\sum_{r=1}^m u_{rk} Y_{rk}}{\sum_{i=1}^n v_{rk} X_{rk}}$$

- Hs : efficiency of object technique s
- m : output object observed
- n : input object observed
- yrk : the number of output r produced by the object k
- xrk : the number of r inputs used by the object k
- urk : the output r weight generated by the object k
- vrk : the input weight r given by the k and r objects which are calculated from 1 to m and i from 1 to n

The equation above showed that the use of one input variable and one output variable. The efficiency ratio (hs), then maximized with the following constraints:

$$\frac{\sum_{r=1}^m u_{rj} Y_{rj}}{\sum_{r=1}^n v_{ik} X_{ij}}$$

$$\leq 1; j = 1, \dots, N$$

Non-negative criteria,

$$urk \geq 0; r = 1, \dots, m$$

$$vrk \geq 0; i = 1, \dots, n$$

BCC efficiency values are got by conducting the model for each DMU. Efficiency values from BCC result are pure technique efficiency values. BCC model locally analyzed each DMU. If we have got pure efficiency value, so scale efficiency value can be calculated by the equation below:

$$SE = \frac{\text{Technical efficiency}}{\text{pure technical efficiency}}$$

RESULTS AND DISCUSSION

This study calculated efficiency technique, which is the efficiency which represented changing process from input into output. It has value range from 1-100%. A Puskesmas unit which has had 100% value certainly efficient. While a unit which has value less than 100% is

inefficient. Further, a Puskesmas unit that has reached the efficiency will be benchmark for other units which are inefficient. It is caused by 2 factor, they are as follows: 1) there are inefficient input using which is caused by excess or scarcity input, and (2) output which is generated from input has not been equivalent with the comparison.

Moreover, from 26 Puskesmas observed in Semarang Regency, there are technically 18

Puskesmas (69.23%) which are efficient and 8 units are not. Puskesmas which are declared to be efficient are Puskesmas which has 100% efficient value. They are Tuntang, Ambarawa, Bancak, Banyubiru, Bawen, Bergas, Bringin, Dadapayam, Duren, Gedangan, Jetak, Jimbaran, Lerep, Leyangan, Pabelan, Pringapus, Semowo, Suruh, and Ungaran.

Table 3. The Summary of the Table of Peers Unit of 26 Puskesmas in Semarang Regency

No	Puskesmas	Efficiency	Efficient Reference Set	<i>Multipliers</i>
1	Sumowono	51.86 %	DADAPAYAM	0.628
			SEMOWO	0.142
			JIMBARAN	0.095
			PRINGAPUS	0.135
			SURUH	0.491
2	Susukan	63.05 %	DADAPAYAM	0.239
			DUREN	0.270
			JETAK	0.130
			SURUH	0.378
3	Kaliwungu	74.09 %	DADAPAYAM	0.259
			DUREN	0.233
			SURUH	0.432
4	Tengaran	75.25 %	PABELAN	0.086
			SEMOWO	0.174
			BANYUBIRU	0.308
			DADAPAYAM	0.047
			SEMOWO	0.069
			BANYUBIRU	0.208
5	Jambu	81.46 %	DUREN	0.560
			BAWEN	0.013
			LEYANGAN	0.102
			SURUH	0.589
			DADAPAYAM	0.144
6	Getasan	90.41 %	DUREN	0.267
			DADAPAYAM	0.299
			DUREN	0.287
7	Kalongan	93.86 %	JIMBARAN	0.391
			UNGARAN	0.023
			JIMBARAN	0.952
8	Tuntang	95.22 %	BANCAK	0.048
9	Ambarawa	100 %	Not Available	Not Available
10	Bancak	100 %	Not Available	Not Available
11	Banyubiru	100 %	Not Available	Not Available
12	Bawen	100 %	Not Available	Not Available
13	Bergas	100 %	Not Available	Not Available
14	Bringin	100 %	Not Available	Not Available
15	Dadapayam	100 %	Not Available	Not Available
16	Duren	100 %	Not Available	Not Available
17	Gedangan	100 %	Not Available	Not Available
18	Jetak	100 %	Not Available	Not Available

19	Jimbaran	100 %	Not Available	Not Available
20	Lerep	100 %	Not Available	Not Available
21	Leyangan	100 %	Not Available	Not Available
22	Pabelan	100 %	Not Available	Not Available
23	Pringapus	100 %	Not Available	Not Available
24	Semowo	100 %	Not Available	Not Available
25	Suruh	100 %	Not Available	Not Available
26	Ungaran	100 %	Not Available	Not Available

(Source: DEA calculation result)

Puskesmas that are not technically efficient are Puskesmas with the efficiency value under 100%, they are Sumowono, Susukan, Kaliwungu, Tengaran, Jambu, Getasan, Kalongan and Tuntang. If the ranking is done, then the Puskesmas with 100% efficiency value has a rating of 1st, 2nd and so on held by the Puskesmas which has an efficiency value less than 100% (<100%). It is sorted from the greatest efficiency value to the smallest. Then, Puskesmas which has the lowest rank is Sumowono with efficiency value 51.86%, and Puskesmas which has the second rank is Tuntang with efficiency value 95.22%.

However, Puskesmas units that have achieved efficiency will be benchmarks for inefficient Puskesmas units. The multiplier value to perform can be seen in the summary table of peers units DEA calculation results.

In the table, there is an Efficient Reference Set that serves as a reference for Puskesmas that have not been efficient to be efficient by adjusting the inefficient output using multiplier as the basis of reference for adjustment. For instance, Puskesmas Tuntang which is inefficient has a value of 95.22%. In order it will be efficient, it is necessary to see Efficient Reference Set that is Puskesmas Jimbaran and Bancak, with shadow price 0,952 and 0,048. Shadow price serves as a multiplier that is used as a basis to adjust the input and output of Puskesmas Tuntang in order to be efficient. While Puskesmas Jimbaran and Bancak are the reference of efficiency for Puskesmas Tuntang, where it can do benchmarking. The calculation of Puskesmas Tuntang variable output adjustment by multiplying multiplier to variable value from Puskesmas which become the reference (adjustment of input variable are ignored). For example, to calculate the value of the

improvement of the output variable "Delivery Assisted by Health Personnel", as follows:

$(0.952 \times 94.52) + (0.048 \times 93.95) = 94.49\%$ etc., the same thing also needs to be done on other output variables that have not been efficient.

CONCLUSION

From the result of calculation of efficiency analysis by using DEA model of BCC (assumption of VRS) of output orientation, the result is from 26 Puskesmas in Semarang Regency year 2014, there are 18 Puskesmas (69.23%) which are technically efficient and other 8 Puskesmas (30.77%) have efficiency value under 100%, so it is declared technically inefficient. The 8 Puskesmas are Getasan, Tengaran, Susukan, Kaliwungu, Tuntang, Jambu, Sumowono and Kalongan. In addition, Puskesmas that have been efficient will become the reference of improvement of input and output for inefficient Puskesmas. While for Puskesmas which technically inefficient can improve its efficiency value by increasing output based on result of DEA calculation. It is suggested that the results of the efficiency assessment by the DEA method can be used as an alternative to periodically assess the efficiency of Puskesmas in Semarang Regency and also as an input to assess, monitor and improve the performance of Puskesmas itself.

REFERENCES

BPS.2015. Jawa Tengah Dalam Angka 2015.
 BPS.2015. Kabupaten Semarang Dalam Angka 2015.
 Budi, Daniel Setyo. 2010. Efisiensi Relatif Puskesmas-Puskesmas di Kabupaten Pati Tahun 2009. Tesis MPKP FE UI.
 Carney, Timothy Jay. 2015. Hypothesis generation using network structures on community health

- center cancer-screening performance. *Journal of Biomedical Informatics*, Volume 57, October 2015, Pages 288-307
- Depkes RI 2002, 2004. Sistem Kesehatan Nasional. Departemen Kesehatan RI.
- . 2008. Kepmenkes Nomor: 828/MENKES/SK/IX/2008. Departemen Kesehatan RI.
- Dinkes Jateng. 2014. Profil Kesehatan Provinsi Jawa Tengah Tahun 2014. Dinas Kesehatan Provinsi Jawa Tengah.
- Dinkes Jateng. 2014. Buku Kesehatan Triwulan 3 Tahun 2014. Dinas Kesehatan Provinsi Jawa Tengah.
- Goldberg, Debora Goetz, et al., 2015. The Organization and Delivery of Family Planning Services in Community Health Centers. *Women's Health Issues*, Volume 25, Issue 3, Pages 202-208
- Kementrian Kesehatan RI. 2015. Profil Kesehatan Indonesia 2014. Kementrian Kesehatan RI
- Kurnia, Akhmad Syakir. 2006. Model Pengukuran Kinerja dan Efisiensi Publik Metode Free Disposable Hull (FDH). *Jurnal Ekonomi Pembangunan*, Vol. 11 No. 2. <http://journal.uui.ac.id/index.php/JEP/article/viewfile/567/49>
- Lubis, Ade Fatma. 2009. Ekonomi Kesehatan. Usu Press
- Mahardika, Ketut. Supadmi, Ni Luh. 2014. Analisis komparatif Puskesmas Denpasar Selatan dan Denpasar Timur dengan menggunakan Metode Balanced scorecard. *E-Jurnal Akuntansi Universitas Udayana*.
- PAU Studi Ekonomi UGM. 2000. Data Envelopment Analisis.
- Peraturan Menteri Kesehatan RI Nomor 741/Menkes/Per/VII/2008 tentang Standar Pelayanan Minimal Bidang Kesehatan di Kabupaten/Kota.
- Prakoso, S. (2015). Efektivitas Pelayanan Kesehatan Bpjs Di Puskesmas Kecamatan Batang. *Economics Development Analysis Journal*, 4(1).doi:<http://dx.doi.org/10.15294/edaj.v4i1.5672>
- Razali, Roni. 2012. Analisis Efisiensi Puskesmas di Kabupaten Bogor Provinsi Jawa barat Tahun 2011. Tesis, Universitas Indonesia.
- Setyaningrum, Dewi Utami. 2014. Analisis Efisiensi Puskesmas Metode Data Envelopment Analysis (DEA). *Skripsi*, Universitas Diponegoro.
- Shaz, Beth H. 2012. Evaluating the Role of Blood Collection Centers in Public Health: A Status Report. *Transfusion Medicine Reviews*, Volume 26, Issue 1, Pages 58-67
- Sukirno, Sadono. 2014. Mikroekonomi, Teori Pengantar (Edisi ke-3). Jakarta: Raja Grafindo Persada.
- Tjiptoherijanto, Prijono. Soesetyo, Boedhi. 1994. Ekonomi Kesehatan. Jakarta: Rineka Cipta
- Wulandari, Retno RR. 2009. Efisiensi Relatif operasional Puskesmas-Puskesmas di Kota Semarang Tahun 2009. Tesis MKPFE UI.