HEALTH MANPOWER FORECASTING IN MALAYSIA

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\textbf{ABSTRACT}

Fülöp and Mejia (1998) believed that manpower in health requires the longest preparatory period of all the health resources and cannot be improvised. It is also subject to a certain inherent inertia, in that the rigidity of the health and education systems and the attitudes of health workers do not make for easy mobility or conduce to improving geographical and occupational distribution. Nor can manpower be stored or discarded. If it is to be available at the proper time, it has to be planned for in advance in the right amount and type, no more and less than is needed. Because they are subject to obsolescence, manpower abilities and skills also need to be maintained by means of permanent supervision and continuing education. So, it is necessary and important to keep planning, especially forecasting health manpower needs. Specifically, the objective of this paper is to forecast the needs of manpower in the health sector in year 2010, in order to deliver the equitable and high quality health care. The data collected for the forecasting purpose using the two methods (ratio of health manpower-output and manpower requirement approach (MRA) are the yearly data of the number of doctors, dentist, nurses, assistant of nurses and GDP others in Malaysia for the period of 1975 to 2004. Based on the result of the two methods, it is can be seen that different method gives different result. In forecasting, especially the preparation, as suggest by Hall (1998) there is no best method. It is worth to try different method in order to see it in the different angle. The important things from the result are the implication to the decision maker. Based on the forecasting it is found that there is an increasing demand for health manpower in the future. In order to fulfill this, the decision maker need to make the adequate preparation, such as training that show result in rather short time compare to educate young people. Another possibility is to contract the manpower from outside of the country such as from India, Myanmar, Pakistan, or Indonesia.

\textbf{Keywords:} Human resource management, Manpower forecasting

\textbf{INTRODUCTION}

Recently, it is becoming obvious, that the economic growth of a country depend more on its quality of human resource than any other source in that country. Country that rich in natural resource but has low quality of man power, will be a poor country, soon after the resource becoming scarce. A country that has high quality of human resource can manage and maintain the natural resource, and then it will give the benefit in a sustainable way. However, high quality of human resource can’t be made in short time; a country has to spent time and invests on education and health.

On the other side, a high quality of human resources in health sector is can be consider a national valuable asset. Health industry is essentially labor intensive, man power constitutes a critical component. According to Tejada-De-Rivero (1998), one of the greatest challenges is managing this manpower in a way that will make it less costly but yet fully capable of meeting what
is the stated goal in most societies, the development of a more accessible, more equitable, more effective health care delivery system. Beside that, access to health care is a basic human right and a primary aim of social development and an essential means to sound economic and social progress. This task according to him is to do the planning in health man power. It is essentially to provide the right number and type of health man power.

Malaysia is one of the developing countries that realized the importance of health man power. This country takes a long effort to educate their people to become a high quality specialist, general practitioners, dentists, nurses and other manpower in health. In the mean time, the shortage of this man power must be fulfilling in order to deliver the equitable and high quality health care. So, it is necessary and important to keep planning, especially forecasting health man power needs in Malaysia.

This paper basically attempts to overview the needs of man power in health in Malaysia for the future time. Specifically, the objective of this paper is to forecast the needs of man power in health sector in year 2010, in order to deliver the equitable and high quality health care.

LITERATURE REVIEW

Health Manpower Planning

The aim of health manpower planning according to Ray and Andreano (1998) is to design manpower mixes and utilization patterns in order to move the health manpower system from a given situation to a predetermined improved situation in the future. A health manpower plan, therefore, represents a coherent set of practical proposals intended to improve health service delivery and distribution through changes in the production, use and motivation of health manpower.

Recently this demand has been increasing especially rapidly in virtually all countries; high population growth, rising social expectations, and socioeconomics development that stimulate the demand for more services, and advances in health technology and the shift in the pattern of disease from the acute illness to youth of the chronic illnesses of the aged stimulate the demand for a greater variety of services.

According to Fülöp and Mejia (1998), manpower in health requires the longest preparatory period of all the health resources and cannot be improvised. It is also subject to a certain inherent inertia, in that the rigidity of the health and education systems and the attitudes of health workers do not make for easy mobility or conduce to improving geographical and occupational distribution. Nor can manpower be stored or discarded. If it is to be available at the proper time, it has to be planned for in advance in the right amount and type, no more and less than is needed. Because they are subject to obsolescence, manpower abilities and skills also need to be maintained by means of permanent supervision and continuing education.

Further more Fülöp and Mejia (1998) shows the consequences of bad planning. According to them, the complete absence of health manpower planning or bad planning has led to acute shortages of services in some countries and areas and to surpluses and imbalances in others. Some countries produce more health workers than they can economically absorbs, while others appear to have an insatiable appetite for them within a situation of underproduction relative to effective demand. The imbalance between the supply of and the demand for health manpower is a result of a basic lack of coordination between the providers of health services on the one hand and the procedure of health manpower on the other. Health manpower is not a commodity whose production can be left to the imperfect functioning of laissez-faire market mechanisms.

Health Manpower Forecasting

As it is mention before the essence of health man power planning problem is trying to provide a supply of health man power adequate to meet society’s increasing demand for health care. One way to estimate the demand of health manpower is using the statistical basis, to forecast that demand. In United States according to Reinhardt (1991) health manpower forecasters in almost a century have always offered projections of the future need and supply of physician, in which the first one was prepared in 1933.
The controversy surrounding major health manpower forecasts is not surprising. Fülop and Mejia (1998) noted that planners recently, found themselves in vast gathering data-gathering operations, where the amount of information collected has greatly exceeded the capacity of planners and decision makers to digest and make use of it. However, Reinhardt (1991), shows that historically the estimates submitted by the forecasters have had a direct impact on the nature of public intervention in the markets for medical education and for medical manpower in America. This intervention tends to alter the constraints faced by the participants (the medical schools and medical professions) in these markets, usually by redistributing dollars and cents among them. The participants have learned the hard way that the dicta of health manpower forecasters cannot be ignored with impunity.

Health Manpower Forecasting Technique

The basic analytic steps in any health manpower forecasting according to Reinhardt (1991) are always the same. The forecast begin with a projection of future changes in the size and in the socioeconomic and demographic composition of the population to be covered by the health system in question. Next, that population forecast is somehow translated into the corresponding future supply of health manpower, and into the corresponding future requirements of particular type of health manpower.

This paper basically employs two different method of forecasting technique because it is always believe that there is no “best” method in forecasting. Although, finally it will come out with different result, it is up to the decision maker to choose the right amount. This paper assumed that, in the context of preparation or planning, it is better to have many opinions than just one.

The first technique employ in this paper is the ratio of health manpower and output. The purpose of this method is to estimate the needs of manpower on various specific jobs, such as the needs on teachers, doctors, technicians, or specialist. In order to do the forecasting this methods needs a robust cross section data. The problems that usually arise using this technique is that, it is quite difficult to determine the optimum value of the ratio of health manpower and output. This technique also does not consider the up and down that always happened in economic setting.

The second technique is manpower requirement approach (MRA). This method can be considered more comprehensive than the first method, introduced by “The Mediterranean Regional Project” (OECD). It is based on the assumption that if the economic continuing to growth then it will always need skill and semiskilled workers, and it is also depend on the information about how to blend the ratio of manpower and capital. Based on that information, the number of needed manpower in the future can be forecasted. This method really needs the information about the estimated growth of GDP that can be obtained through various ways, including the input-output approach, output function method, regression and so on. It is obvious that this method does not consider all non economical factors. This method has been widely used in Malaysia, especially after the release of the document “Toward a Masterplan on Manpower Development” by Mampu in 1983.

Another advantage of MRA method is that the result of the forecast of manpower and economic growth is important in human needs. This is because MRA used information input-output table in order to estimate demand and growth. This method also considering the gap between demand and supply before determined the amount of manpower needs in the future. The weakness of this method including the problem in choosing the suitable GDP growth rate and problem in choosing the ratio of manpower per output, or productivity for manpower in certain industry. Despite this, this method also neglected the effect of manpower substitution. MRA also stress on the training to manpower to have the high skill quality and it is depend on the data and the information of type of job in formal sector that has a fixed wages.

METHODOLOGY

Using Excel and E-Views 5 the data is calculated and analyzed according to each method that consists of different step.
Data Analysis

The data collected for the forecasting purpose using the two methods (ratio of health manpower-output and manpower requirement approach (MRA)) are the yearly data of the number of doctors, dentist, nurses, assistant of nurses and GDP others in Malaysia for the period of 1975 to 2004. The source of data basically from the Year 2006, Book of Statistics, Department of Statistics, Malaysia. The GDP other is the contribution of other sector to GDP, or treat as output in health sector.

<table>
<thead>
<tr>
<th>Years</th>
<th>Doctors</th>
<th>Dentist</th>
<th>Nurses</th>
<th>As nurses</th>
<th>GDP Others</th>
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</thead>
<tbody>
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<td>9283</td>
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<td>959</td>
<td>10658</td>
<td>4794</td>
<td>1006</td>
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<td>833</td>
<td>11999</td>
<td>5402</td>
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<td>767</td>
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<td>6195</td>
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<tr>
<td>1979</td>
<td>3207</td>
<td>826</td>
<td>14206</td>
<td>6923</td>
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</tr>
<tr>
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<td>3858</td>
<td>691</td>
<td>15891</td>
<td>8239</td>
<td>2213</td>
</tr>
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<td>3941</td>
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<td>17392</td>
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<td>9379</td>
<td>2105</td>
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<td>4474</td>
<td>858</td>
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<td>9955</td>
<td>2899</td>
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<td>19348</td>
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<td>22179</td>
<td>11366</td>
<td>5527</td>
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<td>1988</td>
<td>6247</td>
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<td>12007</td>
<td>6248</td>
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<td>1989</td>
<td>6577</td>
<td>1401</td>
<td>23733</td>
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<td>6818</td>
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<td>7012</td>
<td>1471</td>
<td>24364</td>
<td>12578</td>
<td>7631</td>
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<td>1991</td>
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<td>1501</td>
<td>1173</td>
<td>13513</td>
<td>8595</td>
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<td>7719</td>
<td>1562</td>
<td>11961</td>
<td>13429</td>
<td>9389</td>
</tr>
<tr>
<td>1993</td>
<td>8279</td>
<td>1606</td>
<td>11961</td>
<td>12530</td>
<td>10335</td>
</tr>
<tr>
<td>1994</td>
<td>8831</td>
<td>1712</td>
<td>13224</td>
<td>10886</td>
<td>11430</td>
</tr>
<tr>
<td>1995</td>
<td>9608</td>
<td>1750</td>
<td>13647</td>
<td>9677</td>
<td>12780</td>
</tr>
<tr>
<td>1996</td>
<td>10196</td>
<td>1800</td>
<td>14614</td>
<td>9459</td>
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<td>2058</td>
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<td>5819</td>
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<td>24543</td>
<td>5325</td>
<td>19586</td>
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<tr>
<td>2002</td>
<td>17442</td>
<td>2297</td>
<td>35280</td>
<td>7319</td>
<td>21172</td>
</tr>
<tr>
<td>2003</td>
<td>18191</td>
<td>2418</td>
<td>36784</td>
<td>7033</td>
<td>22089</td>
</tr>
<tr>
<td>2004</td>
<td>18246</td>
<td>2550</td>
<td>30002</td>
<td>4243</td>
<td>22156</td>
</tr>
</tbody>
</table>
A. Ratio of health manpower-output.
In this method, first, the average rate of growth between the latest year and basic year calculated using the formula:

\[ r = \frac{n \sqrt[7]{QT/QA}}{n} - 1 \]

where,
- \( r \): the average rate of growth between the latest year and basic year
- \( QT \): health output in the recent year (2003)
- \( QA \): health output in basic year (1996)
- \( n \): years of growth (7)

Then, the health output in 2010 can be calculated using the formula:

\[ X_{ij}(2010) = X_{ij}(2003)(1 + r)^n \]

Where
- \( X_{ij}(2010) \): health output in 2010
- \( X_{ij}(2003) \): health output in 2003
- \( r \): the average rate of growth between the latest year and basic year
- \( n \): years of growth (7)

Finally, the ratio health manpower – output can be calculated using:

\[ L_{ij} = \frac{H_{ij}(2003)}{X_{ij}(2003)} \]

where,
- \( L_{ij} \): the ratio health manpower – output
- \( H_{ij} \): the health manpower in 2003, and
- \( X_{ij} \): health output in 2003

B. Manpower Requirement Approach (MRA)
In this method we have to convert the data into natural logarithm and then find the elasticity of doctors, dentist, nurses and assistant of nurses. The formula is as follows:

\[
\begin{align*}
\text{Lndoctors} &= \beta + \beta_1 \text{Lngdpother} + e \\
\text{Lndentist} &= \beta + \beta_1 \text{Lngdpother} + e \\
\text{Lnnurses} &= \beta + \beta_1 \text{Lngdpother} + e \\
\text{Lnasnurses} &= \beta + \beta_1 \text{Lngdpother} + e
\end{align*}
\]

RESULT AND DISCUSSION
In order to conduct the analysis using the Labor-Output Ratio, the data of output need to be collected; the result of the data is as below:

<table>
<thead>
<tr>
<th>Year</th>
<th>Output value of Medical Services</th>
<th>Output value of Private Hospital &amp; Maternity Home</th>
<th>Output value of Dental Services</th>
<th>Total output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>791,700,000</td>
<td>734,300,000</td>
<td>90,370,000</td>
<td>1,616,370,000</td>
</tr>
<tr>
<td>1996</td>
<td>1,074,510,000</td>
<td>1,149,890,000</td>
<td>118,860,000</td>
<td>2,343,260,000</td>
</tr>
<tr>
<td>1999</td>
<td>1,232,590,000</td>
<td>1,558,970,000</td>
<td>152,320,000</td>
<td>2,943,880,000</td>
</tr>
<tr>
<td>2002</td>
<td>1,434,450,000</td>
<td>2,274,650,000</td>
<td>199,580,000</td>
<td>3,908,680,000</td>
</tr>
<tr>
<td>2003</td>
<td>1,628,610,000</td>
<td>2,708,910,000</td>
<td>228,370,000</td>
<td>4,565,890,000</td>
</tr>
</tbody>
</table>

Source: Year book of statistics 2006, Departemen of statistics, Malaysia
The value of health output in 2010 and 2013 and the value of $r$ is shown in the table below:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4,565,890,000</td>
<td>2,943,880,000</td>
<td>0.0647051</td>
<td>7,081,590,110</td>
<td>8,547,100,078</td>
</tr>
</tbody>
</table>

Finally, the result of forecasting using the Labor-Output Ratio can be seen in Table 3. The table also shows the number of doctors, dentist, nurses and assistant of nurses needed in year 2010 and year 2013.

Table 3. The result of forecasting using Labor-Output Ratio

<table>
<thead>
<tr>
<th></th>
<th>Doctors</th>
<th>Dentist</th>
<th>Nurses</th>
<th>Assistant Nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hij (2003)</td>
<td>18,191</td>
<td>2,418</td>
<td>36,784</td>
<td>7,033</td>
</tr>
<tr>
<td>Xi (2003)</td>
<td>4,565,890,000</td>
<td>4,565,890,000</td>
<td>4,565,890,000</td>
<td>4,565,890,000</td>
</tr>
<tr>
<td>Lij (2003)</td>
<td>0.0000040</td>
<td>0.0000005</td>
<td>0.0000081</td>
<td>0.0000015</td>
</tr>
<tr>
<td>Hij (2010)</td>
<td>28,326</td>
<td>3,540</td>
<td>57,361</td>
<td>10,622</td>
</tr>
<tr>
<td>Hij(2013)</td>
<td>34,188</td>
<td>4,228</td>
<td>6,9231</td>
<td>12,820</td>
</tr>
</tbody>
</table>

The second method of forecasting, that is using Manpower Requirement Approach (MRA), result in different number of doctors, dentist, nurses, and assistant nurses, as shown by Table 4.

Table 4. The result of forecasting using MRA

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctors</td>
<td>18246</td>
<td>0.620281</td>
<td>0.0647</td>
<td>7</td>
<td>10</td>
<td>23,372</td>
<td>25,569</td>
</tr>
<tr>
<td>Dentist</td>
<td>2418</td>
<td>0.402014</td>
<td>0.0647</td>
<td>7</td>
<td>10</td>
<td>2,858</td>
<td>3,047</td>
</tr>
<tr>
<td>Nurses</td>
<td>36784</td>
<td>0.155682</td>
<td>0.0647</td>
<td>7</td>
<td>10</td>
<td>39,378</td>
<td>40,489</td>
</tr>
<tr>
<td>Assistant Nurses</td>
<td>7033</td>
<td>0.055294</td>
<td>0.0647</td>
<td>7</td>
<td>10</td>
<td>7,209</td>
<td>7,285</td>
</tr>
</tbody>
</table>

Based on the result of the two methods, it is can be seen that different method gives different result. In forecasting, especially the preparation, as suggest by Hall (1998) there is no best method. It is worth to try different method in order to see it in the different angle.

The important things from the result are the implication to the decision maker. Based on the forecasting it is found that there is an increasing demand for health manpower in the future. In order to fulfill this, the decision maker need to make the adequate preparation, such as training that show result in rather short time compare to educate young people. Another possibility is to contract the manpower from outside of the country such as from India, Myanmar, Pakistan, or Indonesia.

CONCLUSION

The aim of health planning is basically trying to provide a supply of health man power adequate to meet society’s increasing demand for health care, and one way to estimate the demand of health manpower is to forecast that demand. It is found that different method of forecasting will resulting in different amount of the result of forecasting, but there is no “best” method in forecasting. It is up to the decision maker to choose the right amount, and the most importance things are to learn what the real trend in all the result found.

REFERENCES


