COVID-19

COVID-19: A Scenario of Malaysian Mortality

Wan Muhamad Amir W Ahmad[1)], Noor Azlinaliana Ibrahim[1)], Noraini Mohamad[1)], Farah Muna Mohamad Ghazali[1)], Nor Azlida Aleng[2)], Kasypi Mokhtar[3)], Mohammad Khursheed Alam[4)]

ABSTRACT

Objective: **The main objective of this study was to reveal the death number of the individuals infected by COVID-19 according to the cluster which had been determined by the Malaysia Ministry of Health. There are four main clusters had been identified. This cluster has involved infection up to the third generation. The aim of this study also was to determine the distribution of chronic disease among COVID-19 death patients by revealing the frequencies of the most common chronic diseases. Besides that, trend analysis according to the number of individuals in the ICU and the number of individuals in the ICU with ventilator support is being studied. This is very important to predict the number of ventilators needs while the trend of patients in ICU is increased. The last objective of this study is to determine the distribution of chronic diseases among male and female patients, revealing the most common chronic disease among death patients.**

Materials and Methods: **Data collection started on March 8th 2020 till April 6th, 2020 among the individual who died with COVID-19. The collected data consist of the gender, the cluster of infection, patient chronic disease, number of daily data on COVID-19 death, individuals in the ICU, individual in the ICU with the ventilator. SPSS software version 26.0 and MINITAB 17 was used to assess the important information through descriptive statistics, multiple response analysis, and trend analysis. Results: The total COVID-19 death in Malaysia till April 6th 2020 was 62 cases. It was higher in male with 48 (77.4%) cases as compared to female which was 14 (22.6%) cases. Most of the infected cases are come from the Sri Petaling tabligh religious gathering which contributes about 11 (34.3%), travel history to oversea 11 (34.3%) and follow by close contact with Covid-19 cases 8 (25.0%). Through multiple response analyses, it was found that, most of the individuals who died with Covid-19 have chronic disease such as hypertension (31.1%), diabetes mellitus (28.4%) and heart disease (11.9%). Most of the dead patients shows that they have hypertension. Besides that, the number of covid-19 patients also was summarized according to the hospital in Malaysia. Sarawak General Hospital having the highest death of covid-19 patients followed by Kuala Lumpur Hospital. Trend analysis was plotted in order to see the pattern of the patient which being entered to ICU, and the patient which dependent on the ventilator used.**

Conclusion: **The number of death cases continues on an upward trend, but it is still under control. This is because of the success of first Malaysian Movement Control Order (MCO) which is implemented by the Malaysian government on March 18th, 2020. Based on the daily increasing number of death cases reported and also the infected number of COVID-19, the Malaysian government once again announced the extension of MCO up to the 14th of April 2020. The finding from this study will provide some information about the Malaysian situation and also prepared the strategy to decrease the number of infections and death among the COVID-19.**

KEY WORDS

multiple response, trend analysis, Covid-19

INTRODUCTION

Novel coronavirus or COVID-19 was identified as the cause of a cluster of pneumonia cases in Wuhan, a city in the Hubei Province of China at the end of year 2019. It has rapidly spread from a single city of Wuhan to the entire China just in 30 days followed by an increasing number of cases in other countries throughout the world[1,2)]. The spectrum of COVID-19 disease ranged from mild to critical with most of the infections are self-limiting. The report from Chinese Center for Disease Control and Prevention on February 2020 that included 44,500 confirmed infections with COVID-19 reported that about 81% of patients had mild illness, 14% had severe illness that require hospitalization and oxygen support with 5% require admission to an intensive care unit. About 5% had critical disease with respiratory failure, shock and multi-organ dysfunction syndrome with overall fatality rate of 2.3%[3)].

Received on August 7, 2020 and accepted on November 6, 2020

Correspondence to: Wan Muhamad Amir W Ahmad
(e-mail: wmamir@usm.my)

1) School of Dental Sciences, Health Campus, Universiti Sains Malaysia (USM)
16150 Kubang Kerian, Kota Bharu, Kelantan, Malaysia
2) Faculty of Ocean Engineering Technology and Informatics, Universiti Malaysia Terengganu
Terengganu, Malaysia
3) Faculty of Maritime Studies, Universiti Malaysia Terengganu
Terengganu, Malaysia
4) College of Dentistry, Jouf University
Sakaka, Kingdom of Saudi Arabia

Table 1: Frequency analysis based on gender

	Frequency	Percent
Male	48	77.4
Female	14	22.6
Total	62	100.0

Table 2: Number and frequency of COVID-19 infected based on cluster

	Frequency	Percent
Close Contact with Covid19 case	8	25.0
Sri Petaling Tabligh Religious Gathering	11	34.4
Kuching Church Gathering	2	6.3
Travel history to Oversea	11	34.4
Total	32	100.0

Table 3: The distribution of chronic disease between the male and female

	Gender	
	Male *n*(%)	Female *n*(%)
Hypertension	14(66.7%)	7(33.3%)
Diabetes Mellitus	14(73.7%)	5(26.3%)
Heart Disease	4(50.0%)	4(50.0%)
Kidney Disease	3(60.0%)	2(40.0%)
Gout	1(100.0%)	0(0.00%)
Low Immunity	1(100.0%)	0(0.00%)
Autoimmune Disease	0(0.0%)	1(100.0%)
Severe Acute Respiratory Infection	2(3.2%)	0(0.0%)

Table 4: Multiple Response Analysis

	Responses	
	N	Percent
Hypertension	21	31.3%
Diabetes_Mellitus	19	28.4%
Heart_Disease	8	11.9%
Kidney_Disease	5	7.5%
Gout	1	1.5%
Low_Immunity	1	1.5%
Others_Chronic_Disease	9	13.4%
Autoimmune_Disease	1	1.5%
Severe_Acute_Respiratory_Infection	2	3.0%
Total	67	100.0%

Table 5: Cumulative Number of individual in ICU, with Ventilator Support and Death

Num.	Date	MAS ICU	MAS Ventilator Support	MAS_Death
1	08-Mar-2020	2	2	0
2	09-Mar-2020	2	2	0
3	10-Mar-2020	2	2	0
4	11-Mar-2020	2	2	0
5	12-Mar-2020	3	3	0
6	13-Mar-2020	4	4	0
7	14-Mar-2020	5	5	0
8	15-Mar-2020	9	9	0
9	16-Mar-2020	12	12	0
10	17-Mar-2020	12	12	2
11	18-Mar-2020	15	15	2
12	19-Mar-2020	20	20	2
13	20-Mar-2020	26	26	3
14	21-Mar-2020	37	23	8
15	22-Mar-2020	46	22	11
16	23-Mar-2020	57	27	14
17	24-Mar-2020	64	27	16
18	25-Mar-2020	45	34	20
19	26-Mar-2020	45	32	24
20	27-Mar-2020	54	34	26
21	28-Mar-2020	73	54	27
22	29-Mar-2020	73	52	34
23	30-Mar-2020	94	62	37
24	31-Mar-2020	94	60	43
25	01-Apr-2020	102	66	45
26	02-Apr-2020	105	54	50
27	03-Apr-2020	108	54	53
28	04-Apr-2020	99	50	57
29	05-Apr-2020	99	48	61
30	06-Apr-2020	102	54	62

Since the World Health Organisation (WHO) has announced that COVID-19 reached the pandemic stage on 11 March 2020, the total number of patients infected with COVID-19 disease in worldwide had increased tremendously[4]. On April 6th 2020, there was 1,272,246 of patients was infected with COVID-19 virus with total deaths of 69,375 (5.54%) worldwide. The highest deaths occur in Italy, followed by Spain and United States. Malaysia had reported about 62 cases of deaths from COVID-19 disease on April 6th 2020[5]. COVID-19 tends to cause more severe illness in older age people more than 65 years old, had co-morbid disease such as patients with chronic lung disease, severe asthma, diabetes mellitus, chronic kidney disease, liver disease and immunocompromised patients[6]. A study in Wuhan, China reported that, predictors of a fatal outcome in COVID-19 cases included age, the presence of underlying diseases, the presence of secondary infection and elevated inflammatory indicators in the blood. The results obtained from this study also suggest that COVID-19 mortality might be due to virus-activated "cytokine storm syndrome" or fulminant myocarditis[7]. Another study in Italy found that, COVID-19 is more lethal in older patients and the higher older age distribution in Italy may explain a higher case fatality rate as compared with other countries[8].

First phase movement control order (MCO) was started in Malaysia on March 18th 2020 till March 31st 2020[9]. However, it was extended till April 14th 2020 and further extension of MCO until April 28th 2020 was announced by Malaysia Prime Minister on April 10th 2020 in order to help healthcare workers to contain the disease spread[10,11]. This is also to ensure the number of infected and the number of deaths is reduced as figures shows number of deaths cases increasing from 20 cases on the date of second extension of MCO was announced which was on March 25th 2020 to 70 cases on April 10th 2020[12]. Therefore, this study was conducted to reveal the death number of the individuals infected by COVID-19 according to the cluster and to determine the distribution of chronic disease among COVID-19 death patients in Malaysia.

MATERIALS AND METHODS

This study was conducted by reviewing the daily death data of COVID-19 patient from March 8th 2020 till April 6th, 2020. The data are being collected from Official Portal Ministry of Health Malaysia[5]. The demographic profile of patients was included like gender, age in year, date admission to the ward, date of death, days of hospitalization, using ICU ventilator, the cluster of infection, selection of hospital, a listing of chronic disease as such hypertension, diabetes mellitus, heart disease, kidney disease, gout, low immunity, autoimmune disease, and severe acute respiratory infection. There are four main clusters that had been identified in this study, they are; cluster of Sri Petaling Tabligh Gathering, cluster of Kuching Church Gathering, cluster of close contact with COVID-19 case and cluster of travel history to oversea. All the information will be recorded, and statistical analysis was performed by using Statistical Package for the Social Sciences (IBM SPSS, Chicago, IL, USA, software version 26.0) and MINITAB version 17. The descriptive analysis as well as frequencies analysis, crosstabulation analysis multiple response analysis and

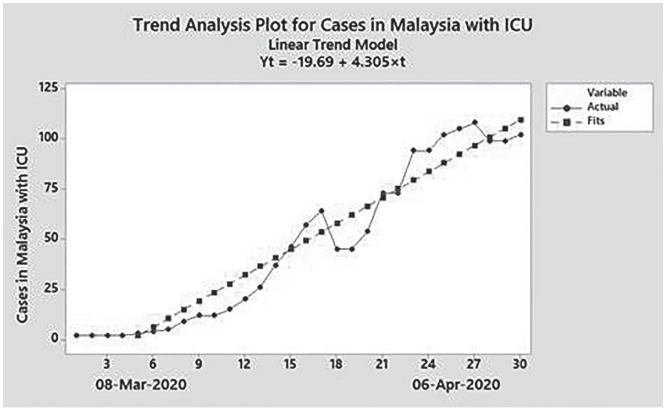

Figure 1: Trend analysis plot for the case in ICU.

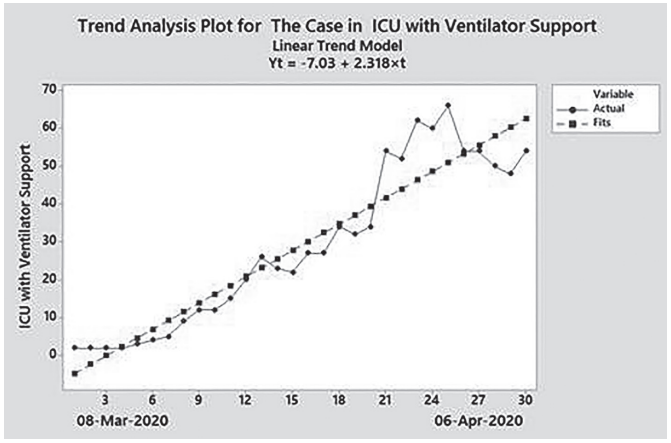

Figure 2: Trend analysis plot for the case in ICU with ventilator support.

trend analysis. Through all statistical analysis, it is hoped that the findings will bring more important information to the health care providers and awareness to the public. Besides that, it can also be used as an initial setting for the best strategy to deal with COVID-19 issues.

RESULT

A total COVID-19 death in Malaysia was 62 cases. All the cases were analyse using SPSS software version 26.0 and MINITAB 17. At first, the descriptive statistics were performed according to gender.

Table 1 shows the number of deaths in Malaysia by gender. It was found that male patient was riskier on more death, with 48 (77.4%) compared to female 14 (22.6%). Most of the male patient attends Sri Petaling Tabligh Gathering compared to female. From the observation, the female patient is more in close contact with the COVID-19 case.

Table 2 shows the contributors and number of deaths caused by Covid-19 according to the cluster. Cluster from Sri Petaling religious gathering and traveling history to overseas were the main factors contributed to the deaths. This scenario shows that COVID-19 can easily spread through gathering activity. Travel history to oversea also recorded a relatively high in number of deaths among COVID-19. Through the specific observations, history of travelling frequency to oversea can be detail according to the countries. Three cases come from Italy and the rest come from Turkey, India, Vietnam, Saudi Arabia, and Indonesia.

Table 3 shows that male is more likely to have chronic disease as compared to the female. The data released that the number of male deaths who died of COVID-19 also associated with complications of hypertension and diabetes mellitus. These two factors are prominent in the COVID-19 death scenario. It is advisable to the public, that these two chronic diseases having more risk of death.

To prove, both factors which were hypertension and diabetes mellitus, the multiple response analysis approaches is being used. Through this procedure, hypertension is the first factor while diabetes mellitus is the second factor which dominant among the dying patient with the COVID-19 (see Table 4). Heart disease comes at the third ranking among the lists of chronic disease. It's contributed about 11.9% to the death of COVID-19 patient.

Table 5 shows the cumulative number of individuals in ICU, with ventilator support and death according to the date which starts on Mar 8th, 2020 till April 6th, 2020. From the daily recorded data, we can see that, there is an increase in the number in the trend of entering in ICU. A similar trend also goes to the use of ventilator support and the number of deaths. The number of deaths still increases, but it is still under control. The first MCO started from 18th March till the 31st of March 2020[9]. Based on the daily increasing number of infected cases reported, the Malaysian government once again announced the extension of MCO up to the 14th of April 2020[10]. The success of the MCO can be seen by the number of deaths, which increased slowly.

Figure 1 shows the specific trend of cases that entered ICU from March 8th, 2020, until April 6th, 2020. The trend of the admitted patient which entered ICU is increased in a linear trend, but from the observation, there are only a few cases reported daily, which means, the initiatives of the Malaysian government which introduce MCO is the best move at the right time.

Figure 2 shows the specific trend of cases that entered the ICU with ventilator support from March 8th, 2020, until April 6th, 2020. A similar trend was assessed for the admitted patient which entered ICU with ventilator support. It is increased in a linear trend and it is like the case which entered ICU without ventilator support.

Table 6 shows the recorded data of the real number of deaths caused by COVID-19 in Malaysia by hospitals from March 17th, 2020 until April 5th, 2020. The total number of deaths was 62. Recorded data had shown that the highest death was occurred in Sarawak General Hospital which was 9(14.5%) cases that due to Kuching Church Gathering. The second high is being recorded form Kuala Lumpur Hospital which was 6 (9.7%) deaths, followed by Tuanku Jaafar Hospital, Raja Permaisuri Bainun Hospital, and Enche' Besar Hajjah Khalsom Hospital that recorded 4 (6.5%) deaths respectively. There were 26 hospitals with less than 3 (1.6% – 4.8%) deaths caused by COVID-19 in Malaysia.

DISCUSSION

The COVID-19 pandemic has impacted not only the health and social well-being of Malaysians but also, directly and indirectly, caused disturbance to all agencies. Around 210 countries and territories, the whole world has been affected by the COVID-19. The number of infecting and death is keeping increasing. Overall, the COVID-19 had infected 1,696,323 people worldwide, and the total number of deaths had increased to102,672 until April 11th, 2020[5]. The case of COVID-19 in Malaysia is rising by the hundreds each day including Sabah and Sarawak. At the same time, the number of deaths is also rising (Table 5). Malaysia also reported the first deaths due to the coronavirus in the country on March 17th, 2020. The trend of death is found to be a linear increase. Daily death data had been recorded starting from March 17th, 2020, till April 6th, 2020. From the observations, the cumulative number of deaths by April 6th, 2020, is 62.

Malaysia through the Ministry of Health has put a lot of effort to prevent this number from getting increase by implementing Movement Control Order (MCO), tracing those in contact with persons tested positive for the coronavirus (treated based on CPG/MOH guidelines), put patient in isolation ward, home-quarantined and many more[13]. The number of deaths in Malaysia consists of 48 (77.4%) of males and 14 (22.6%) of females. From the analysis it can be summarized that Sri Petaling Tabligh Religious Gathering 11 (34.4%), traveling history to overseas 11 (34.4%) (this including Turkey, Vietnam, India, Indonesia, Saudi Arabia, and Italy) and the case of close contact with COVID-19 case 8 (25%) and 2 (6.3%) is coming from Kuching Church Gathering. Most of the death cases reported that patients having the chronic disease are more likely to die. To determine the most frequent type of chronic disease among the COVID-19 death, the frequency and multiple response analyses were applied to the death COVID-19 data. Surprisingly from the analysis, it was found that hypertension and diabetes mellitus is the highest two among the lists of chronic disease. The tabulation between the male and female across these two factors had been made. Among genders, it was found that hypertension in males has 14 (66.7%) whiles in females was 7 (33.3%). Diabetes mellitus among male 14 (73.7%) while female 5 (26.3%) cases. Results from multiple response analyses found that most of the death cases among COVID-19 patients have hypertension or diabetes mellitus. This indicates that,

Table 6: Distribution of COVID-19 death according to Malaysia Hospital

	Frequency	Percent
Sultanah Nur Zahirah	1	1.6
Umum Sarawak	9	14.5
Kuala Lumpur	6	9.7
Keningau	1	1.6
Institut Jantung Negara	2	3.2
Sultan Ismail Petra	2	3.2
Tengku Ampuan Afzan	1	1.6
Tuanku Jaafar	4	6.5
Raja Permaisuri Bainun	4	6.5
Sultanah Aminah	1	1.6
Pakar Sultanah Fatimah	3	4.8
Enche' Besar Hajjah Khalsom	4	6.5
Rumah sendiri	1	1.6
PPUM	3	4.8
Tengku Ampuan Rahimah	1	1.6
Sungai Buloh	2	3.2
Miri	2	3.2
Permai, Johor	2	3.2
Tangkat	1	1.6
Sultanah Bahiyah	1	1.6
Angkatan Tentera Tuanku Mizan	1	1.6
Sultan Ismail	1	1.6
Sultanah Nora Ismail	1	1.6
Canselor Tuanku Muhriz	1	1.6
Kluang	1	1.6
Swasta	1	1.6
Tumpat	1	1.6
Tuanku Fauziah	1	1.6
Pulau Pinang	1	1.6
Tawau	1	1.6
Melaka	1	1.6
Total	62	100.0

those public which suffering of this both disease need to be more extra careful. This is because those who are having hypertension or diabetes mellitus being more risky on death.

Table 5 shows the trend of death cases and the need on the ventilator. It can be seen clearly that, the pattern of using ventilator and the pattern of death increase by the time. Most of the recorded case had shown that COVID-19 causes the patient to not breathe well as their symptom. Increasing the number of infected patients to the ICU, also causes the dependency probability of the ventilator is higher. As a consequence, the ministry need to provide more ventilator unit to handle the increasing case of COVID-19 patient. Trend analysis through the linear trend model had been used to see the pattern of cases which being warded to ICU (see Figure 1). The linear trend model is given by $Yt = -19.69 + 4.305\ t$. Using this model, the trajectory of the patient being warded in ICU can be predicted over time. This is very important to forecast the numbers of the patient in ICU because this information indirectly assists the Ministry of Health for the further action taken. This linear trend method is being extended to the case in ICU with ventilator support. The trend model is given as $Yt = -7.03 + 2.318\ t$. It is observed that the trend for the case in ICU with ventilator support is a linear increase (Figure 2). Table 6 summarized the number of hospitals with the highest number of deaths. Most of the death cases are coming from Sarawak General Hospital and Kuala Lumpur Hospital.

CONCLUSION

This paper concludes the trends of COVID-19 is still increasing, in which death cases and under ventilators are also increased. By the time this study is conducted, total death at 62 persons with male dominate 48 (77.4%) to 14 (22.6%) female. Those who died because of COVID-19, mainly related to hypertension and diabetes mellitus. It shows that those with hypertension and diabetes mellitus are relatively riskier patients. From this analysis and pattern it shows that, those positive Covid 19 with chronic disease are relatively risky under to be treated in Intensive Care Unit. The other significant point is that this study shows the Sri Petaling Cluster Tabligh are the main contributor to this death cases, especially when the patient are mostly senior citizen with chronic disease. Even though Cluster Tabligh is the main contributor, Sarawak General Hospital and Kuala Lumpur Hospital recorded highest death cases which is not main contributor from Cluster Tabligh. Comparing the Malaysian death cases with the worldwide scenario, the Malaysian Healthcare system is advanced due to extensive support from the Malaysian government through investment in hospital's medical infrastructure[14]. The Ministry of Health has done a great job by providing general guidelines and also recommendation action plans for prevention, control of COVID-19 and minimize the spread among Malaysian[13]. Without an easy and general guideline, it is very hard to reduce the transmission risk of COVID-19 in public. Besides that, it is important to strengthen the public health measures and surveillance by giving them an adequate awareness of the prevention and control of COVID-19.

ACKNOWLEDGMENT

The authors would like to express their gratitude to School of Dental Sciences, Universiti Sains Malaysia (USM) for providing the research funding.

REFERENCES

1. Vital Surveillances. The Epidemiological Characteristics of an Outbreak of 2019 Novel Coronavirus Diseases (COVID-19)—China, 2020. China CDC Weekly. 2020; 2(8): 113-22.
2. World Health Organization (WHO). WHO Director-General's remarks at the media briefing on 2019-nCoV (2020, February 11). Retrieved from https://www.who.int/dg/speeches/detail/who-director-general-s-remarks-at-the-media-briefing-on-2019-ncov-on-11-february-2020
3. Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention. Jama. 2020; 323 1239-1242.
4. World Health Organization (WHO). WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020 announced COVID 19 is pandemic (2020, March 2020). Retrieved from https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020
5. Ministry of Health Malaysia. Statistic on COVID-19 disease (2020). Retrieved from https://www.facebook.com/pg/kementeriankesihatanmalaysia/photos/?ref=page_internal
6. Centers for Disease Control and Prevention (CDC). People Who Are at Higher Risk for Severe Illness of COVID-19. Retrieved from https://wwwcdcgov/coronavirus/2019-ncov/need-extra-precautions/people-at-higher-riskhtml. 2020.
7. Ruan Q, Yang K, Wang W, Jiang L, Song J. Clinical predictors of mortality due to COVID-19 based on an analysis of data of 150 patients from Wuhan, China. Intensive care medicine. 2020: 1-3.
8. Graziano O, Giovanni R, Silvio B (2020, March 23). Case-fatality rate and characteristics of patients dying in relation to COVID-19 in Italy. JAMA. DOI: 10.1001/jama.2020.4683.
9. Tang A (2020, March 16). Malaysia announces movement control order after spike in Covid-19 cases (updated) [TheStar]. Retrieved from https://www.thestar.com.my/news/nation/2020/03/16/malaysia-announces-restricted-movement-measure-after-spike-in-covid-19-cases
10. Anis MN (2020, March 25). MCO extended to April 14 (updated) [TheStar]. Retrieved from https://www.thestar.com.my/news/nation/2020/03/25/mco-extended-to-april-14
11. Rodzi NH. Coronavirus: Malaysia extends movement curbs by another two weeks to April 28 2020 on 10th April 2020. News Staits Time. 2020. Retrieved from https://www.straitstimes.com/asia/se-asia/coronavirus-malaysia-extends-movement-curbs-by-another-two-weeks-to-april-28.
12. Pfordten D, Ahmad R. Covid-19: Current situation in Malaysia (updated daily). TheStar.2020. Retrieved from https://www.thestar.com.my/news/nation/2020/03/23/covid-19-current-situation-in-malaysia-updated-daily.
13. Ministry of Health Malaysia(MOH). Guidelines on COVID-19 Management in Malaysia no. 05/2020 (5th Edition) (2020, March 25). Retrieved from http://www-mohgovmy/indexphp/pages/view/2019-ncov-wuhan-guidelines. 2020.
14. Economic Transformation Programme; Healthcare NKEA (2015). Retrieved from https://www.npra.gov.my/images/Announcement/2015/NRC-2015-day3/P10.3-P-NKEA-Healthcare2015-FABIAN-DELL.pdf