Closing the Radiotherapy Gap in Indonesia: Reflection on National Roadmap Program

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BACKGROUND AND OBJECTIVE

Cancer has been increasingly become a burden in the world, particularly in developing countries such as Indonesia. Based on GLOBOCAN 2018, Indonesia cancer cases is expected to rise from 348,809 to 575,814 in 2040 or a 65.1% increase. Moreover, cancer attributable deaths will also spike up 76.9% from 207,210 to 366,567 deaths in 2040. Out of those number, the five most prevalent cases are breast, cervix uteri, lung, colorectum and liver.[1] There are three mainstay treatments for cancer, including surgery, radiotherapy and chemotherapy. As one of the mainstay treatments, radiotherapy is an essential part of cancer management.[2] It is estimated that around 50% of cancer patients need this type of treatment. Looking into the number of cancer cases in 2018, around 174 thousand cancer patients need radiation therapy.[1,2] This number of cancer cases can be translated into 343 machines needed for the treatment of cancer using conventional fractionation. Using hypofractionation strategy, it is estimated that 268 teletherapy machines are needed. Talking about teletherapy machines needed per million population, Indonesia with over 270 million population, if 1 MV is needed for every 1 million population, 270 teletherapy machines are needed to ensure radiation treatment for every Indonesian citizen. Currently, radiotherapy (RT) machines available across the country only covered 29.82% of the country's needs (using hypofractionation strategy). This study aims to present the reflection on Indonesian Radiation Oncology Society (IROS) national roadmap program to close the gap of radiotherapy services in Indonesia.

METHODS

Roadmap of Indonesia radiotherapy services were established in 2010 for the escalation of radiotherapy services. Moreover, this roadmap was updated every 5 year to calculate the accomplishment of the projected outcome. Further update is conducted in certain year whenever needed, especially if newest available data is needed for advocacies.

RESULTS AND DISCUSSION

These 5 yearly programs were divided into 9 different regions in Indonesia, each consisted of several provinces with different aims on the number of teletherapies needed. The rationalization on calculating the number needed are based on the number of populations, developing and archipelagic setting of the country, integration with national cancer control plan, cancer awareness among citizen, health promotion and continuing medical education for health professionals (especially oncologists). Multidisciplinary approach and guideline should also be obeyed by all oncologists to increase the utility of radiation therapy. Due to the circumstances that not all the criteria are able to be fulfilled, the society decided that this program aims to achieve 189 teletherapy machines by the end of 2035, or around 70% of 268 machines needed based on hypofractionation strategy calculation.

Currently, this program has reached the second 5-yearly evaluation. By the end of 2020, it is known that 80 RT machines are currently available in Indonesia. From table 1, we can see that most teletherapies are available in region 3 (DKI Jakarta, West Java and Banten) and region 4 (Central Java and Jogjakarta). However, despite being set up from 2010, there is one region (Maluku and Papua) which has no teletherapies at all. Looking at the data, it has fulfilled 100% of the target in 2020 (80 machines). Nevertheless, the fulfillment is not distributed equally across Indonesia as someplace even is yet to have a teletherapy machine.

Table 1. Roadmap of radiotherapy in Indonesia (2010-2035).

Roadmap Radiotherapy 2010-2035

5 yearly program to achieve 0.8 MV / 1 million population, from 2010-2035

No	Region	Population	Realization by the end of 2020	**Step I 2010/2015**	Step II 2015/2035				Total MV Needed*
				Program	Program	Program	Program	Program	
				I	II (2015/2020)	III (2020/2025)	IV (2025/2030)	V (2030/2035)	
1	Aceh, North Sumatera, West Sumatera, Riau	30.623.691	8	5	4	4	4	5	22
2	Jambi, South Sulawesi, Bengkulu, Lampung, Bangka Belitung, Riau Archipelago	25.009.775	4	4	3	3	4	4	18
3	DKI Jakarta, West Java, Banten	69.527.126	27	13	9	9	10	10	51
4	Central Java, Yogyakarta	39.386.738	21	7	5	5	5	6	28
5	East Java	41.192.606	9	7	5	5	6	6	29
6	Bali, West Nusa Tenggara, East Nusa Tenggara	14.363.547	4	3	2	2	2	2	11
7	Kalimantan Island	34.219.378	3	3	2	2	2	2	11
8	Sulawesi Island		4	3	2	2	2	3	12
9	Maluku,Papua	6.792.595	0	2	1	1	1	2	7
TOTAL		261.115.456	80	47	33	33	36	40	189

*Population data based on extrapolation from World Bank Population Projection 2018 and Indonesia National Population Census 2010

CONCLUSIONS

Cancer is an emerging problem in Indonesia. Radiation therapy plays a great role as one of the mainstay treatments for cancer, but the number of teletherapies is far from the needs. Nevertheless, the roadmap of RT services within the country is essential for every nation for

guidance on how to close the gap of RT services in the respective country. There are several factors to be considered during the development of RT services, including distance in the archipelagic country with 17,000 islands, density of population, common cancer and public awareness. Using the respective guidance, IROS has set up the 5-yearly roadmap for radiotherapy from 2010 to 2035 to stepwisely guide, scale up and fulfill the demand of RT services. Despite of the challenges, Indonesia is currently on the track to close the gap of RT services, with 100% fulfillment in the second programs and being ready for the next 5-year program. There are still a lot of homework in the next decade to keep the sustainability of the track for closing the gap and achieve the goals of the roadmap. To fill up the disparities across countries, multiple cooperation from the society to national and local government, private sectors and military paths have been conducted. This roadmap of radiotherapy has been given to the stakeholders in the Ministry of Health and incorporated into the National Cancer Control Plan (2015-2019).[3] Further set up of the radiotherapy program has also been done with private hospitals or investors through public-private partnership framework (build operate transfer or joint cooperation). Additionally, to increase the utility of radiotherapy, setting up radiotherapy program should integrate multidiscipline and involve stakeholders.

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