

INTRODUCTION

An estimated 70-80% of malignancies need multimodal treatment, which includes surgery, radiation, and chemotherapy. Radiation oncology is particularly vulnerable to regional disparities in access to care due to the unique nature of its treatments. It is vital to define geographic and demographic access to radiotherapy in order to improve patient access to clinical care. This first of its kind study aimed at quantifying the available radiation oncology resources across all Asian countries.

METHODS

The availability of Teletherapy and Brachytherapy resources of all Asian Countries was obtained from IAEA-DIRAC. The population was estimated using World Bank Population Estimates. The incidence of cancers was obtained from Globocan Reports. An available number of treatment units were compared with that of the population, overall cancer incidence, and five most common cancers among countries across Asia.

Total EBRT treatment capacity was estimated by multiplying the number of units per country by 240 working days. Assuming that 50 patients would be treated per day, a proportional treatment space of 15% was estimated for Breast and lung cancers and, 10% each for the stomach, cervical and oesophageal cancers. Therefore, feasible fractions were estimated as: number of EBRT units per country \times 240 \times (0.15 or 0.10) \times 50. The number of excess or deficit fractions was calculated, and the total number of extra machines required was arrived at.

RESULTS

Number of teletherapy units varied from 1 to 1825 across countries. Yemen had the least number of teletherapy units per million population (0.03) whereas Japan had the highest (8.66). Brunei had 1 teletherapy machine per 493 cancer cases whereas North Korea had 1 machine per 19218 cases. Qatar had 1 brachytherapy machine for 1482 cancer cases and Taiwan had 1 Brachytherapy machine for 55483 cancer cases. 41 countries had a deficit in number of teletherapy machines with respect to breast cancer. Similarly, 33, 28, 32 and 18 countries had a deficit with respect to lung, stomach, cervical and oesophageal cancers respectively.

DISCUSSION & CONCLUSION

This is a one-of-a-kind study that investigated not only the number of brachytherapy units but also the deficiency of BT units in terms of population and cancer incidence in each country in Asia. The study also looked at the shortage of brachytherapy units in terms of gynecological cancers, where brachytherapy is most widely employed. International radiation and brachytherapy associations recognize the necessity of improving existing brachytherapy programs and launching new ones to alleviate the cancer burden in developing countries, and they are working to incorporate their expertise into existing and future projects. The study identified deficits of radiotherapy units in terms of geographic and demographic aspect across Asian countries and provides a roadmap for the development of radiation oncology infrastructure.

REFERENCES

- Bates JE, Thaker NG, Parekh A, Royce TJ. Geographic access to brachytherapy services in the United States. *Brachytherapy* 2022;21:29–32. <https://doi.org/10.1016/j.brachy.2021.05.004>.
- Laskar SG, Sinha S, Krishnatry R, Grau C, Mehta M, Agarwal JP. Access to Radiation Therapy: From Local to Global and Equality to Equity. *JCO Glob Oncol* 2022. <https://doi.org/10.1200/go.21.00358>.
- Munshi A, Ganesh T, Mohanti B. Radiotherapy in India: History, current scenario and proposed solutions. *Indian J Cancer* 2019;56:359. https://doi.org/10.4103/IJC.IJC_82_19.