

Editorial

Gender Parity in Healthcare: A Chronicle of Escalating Success Rate of Female Radiation Oncologists in India

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Abstract



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Objectives This editorial describes the growth pattern of female radiation oncologists (FRO) in India and the prediction of gender equality through a mathematical formulation.

Materials and Methods Among the countries in South Asia, India has the largest population of radiation oncologists (RO), a total of 3,763: 1,286 female and 2,477 male radiation oncologists (MROs), and they are registered with the Association of Radiation Oncologists of India (AROI). The data were analyzed to find the differential and cumulative growth pattern of the FROs and MROs and predict gender equality in radiation oncology. The cumulative growth rate indicates the total number of FROs and MROs by end of every year. Differential growth rate indicates the differential increase in the number of FROs and MROs for a particular year. Annual cumulative and differential growth patterns were plotted as a function of the time, and an analytical functional form was fitted to predict the future growth pattern and achievement of gender equality.

Results AROI registration of FROs and MROs for 2013–2020 were as follows: FRO: MRO 2013-54: 102, 2014-99: 162, 2015-77: 148; 2016-86: 143, 2017-110: 110, 2018-116: 151, 2019-121: 152, 2020 (October)-129: 110. Differential growth pattern between 2013 and 2020 with the average incremental growth rate for FROs and MROs were $12.7 \pm 14.8\%$ and $2.1 \pm 32.0\%$. Differential growth rate FRO fits in a power-law exponent $58.6 \times (\text{Power}^{0.3695})$, where MRO growth pattern showed a saturation $[4.7 \ln(x) + 128.5]$. Gender parity among Indian radiation oncologists is likely to be achieved by end of 2027.

Conclusions The present density of FRO in India 34.1% is high compared to developed countries such as the United States ($\approx 26\%$). It is a big leap for the Indian radiation oncology society tending toward gender parity.

Keywords

- gender parity
- woman radiation oncologist
- India

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Contemporary social movements such as #MeToo has accentuated the attention toward gender disparity in social as well as in the professional front.^{1,2} Given this strong global interest in the advancement of professional success of women and after a century of feminist advocacy in the developed and half-century in the developing world and 40 years of international efforts on increasing gender equality, the representation of women in the decision-making and leadership position is still as low as 20%.¹ Accelerated health risk through discriminatory social norms, practices, values, and beliefs, therefore, makes it essential to achieve gender equality. The question being, “Why does gender parity matter for opportunities in medicine, science, and, global health?” Potentially, gender equality in medicine, science, and global health germinates to substantial social and economic gains.^{1,2} Furthermore, gender parity is a basic human right and is essential for the achievement of peaceful and financially balanced societies with comprehensive utilization of human potential and sustainable growth.^{3,4}

Unexpected variations in gender representation have been observed in the scientific and healthcare community.^{1,3,4} The following editorial analyzes the growth in the representation of the female radiation oncologist workforce in India in recent times and the following progress toward gender equality.

Among the countries in South Asia, India has the largest population of radiation oncologists.^{5,6} The Association of Radiation oncologists of India (AROI) offers directive and professional training either directly or through its derivative Indian College of Radiation Oncologists (ICRO) since 1992. It is indispensable for all radiation oncology MD/DNB students to get registered with the AROI to attend the ICRO teaching courses. Therefore, AROI membership data is actual of the population of radiation oncologists in India. The data on the registered radiation oncologists have been extracted from the member list of the AROI website.⁷ The recorded number of female and male radiation oncologists until October 2020 were 1,286 and 2,477 respectively. The list of AROI members was thoroughly verified and found around 200 people were not in active oncology practice, which included around 20 FROs and the rest 180 MROs. The total number of functional radiation oncologists is 3,563 and divided between FROs and MROs as 1,266 and 2,297, respectively.

The registration of FROs and MROs with AROI for 2013–October 2020 was as follows:

FRO:MRO (2013)–54: 102, (2014)–99:162, (2015)–77:148; (2016)–86:143, (2017)–110:110, (2018)–116: 151, (2019)–121:152, 2020 (October)–129: 110. The number of FRO registration was equal to and greater than MRO in 2017 and 2020, respectively. The temporal distribution of cumulative and differential growth patterns for FROs and MROs are presented in **Fig. 1**.

The left and right y-axes represent the cumulative growth pattern on a logarithmic scale and differential growth (FRO/year and MRO/year) on a linear scale. Differential growth patterns were limited between 2013 and 2020 with the average growth rate for FROs and MROs being $12.7 \pm 14.8\%$ and $2.1 \pm 32.0\%$, respectively, as observed. Differential

FRO growth fitted well with a power-law exponent of -58.6×0.3695 , where MRO growth pattern showed a high degree of saturation, fitting with almost linear (or logarithmic) $(4.7 \ln(x) + 128.5)$ function.

Utilizing the data on average growth over the last 8 years (2013–2020), the number of FROs and MROs is predicted until 2030. Gender equality among Indian radiation oncologists is likely to be achieved by end of 2027. With a conservative estimate of 8% increase in FROs/year, instead of the actual 12.7%, the cumulative FRO number will touch the MRO number by June 2032. The growth pattern for MRO is not very steady with a high standard deviation, which might lead to a fluctuation in the predicted value. Nonetheless, the growth pattern of FRO is quite steady over the last 7 years and continues to grow in the set pattern as predicted in this analysis.

Representative numbers of FROs in India is superior to that in the western world such as the United States where practicing FRO is 26.5% of the male counterpart, compared to 34.1% in India.² Our earlier study found that 47% of the FROs took classroom lectures, which was also similar to that of the western world.⁶ Nevertheless, the leadership positions are still very limited for the FROs.^{6,8} A rough estimate on major hospitals in four metropolitan cities (Delhi, Kolkata, Mumbai, and Chennai) and a few large public hospitals having post-graduation in radiotherapy indicate only 17% of leadership positions are occupied by FROs. This is attributed to the fact that the initial (1990–1995) low concentration of FROs in the radiation oncology practice led to a lower number of women in leadership positions presently. However, with the significant increase in the number of FROs in the practice accompanied by sufficient incubation time, the leadership positions would also be equally shared between male and female radiation oncologists in the future.

In an isolated incident, we have observed the “All Women Radiation Oncology Department” in New Delhi–NCR, which is symbolic of the progress. We expect the number of FROs will continue to increase in the near future at the present rate, without the identification of any potential threat to the growth rate for radiation oncology has achieved a prestigious position among the clinical super specialties.

Conclusively, quantitative gender equality will have a direct effect in two ways, firstly around 2027–2028, Indian radiation oncologists' population will be gender neutral and secondly, in the subsequent years the gender disparity in a leadership position will also hopefully be neutralized. Often female cancer patients especially gynecological and breast cancer patients are more comfortable with lady doctors for discussion and especially for examination; an increased female clinicians' representation in a specialized field such as cancer significantly increases the comfort level for female patients in the hospital/treatment environment. As an indirect effect, the increased representation of women would reduce the chance of sexual harassment (it is undesired but present in our society), better working conditions, financial benefits, and

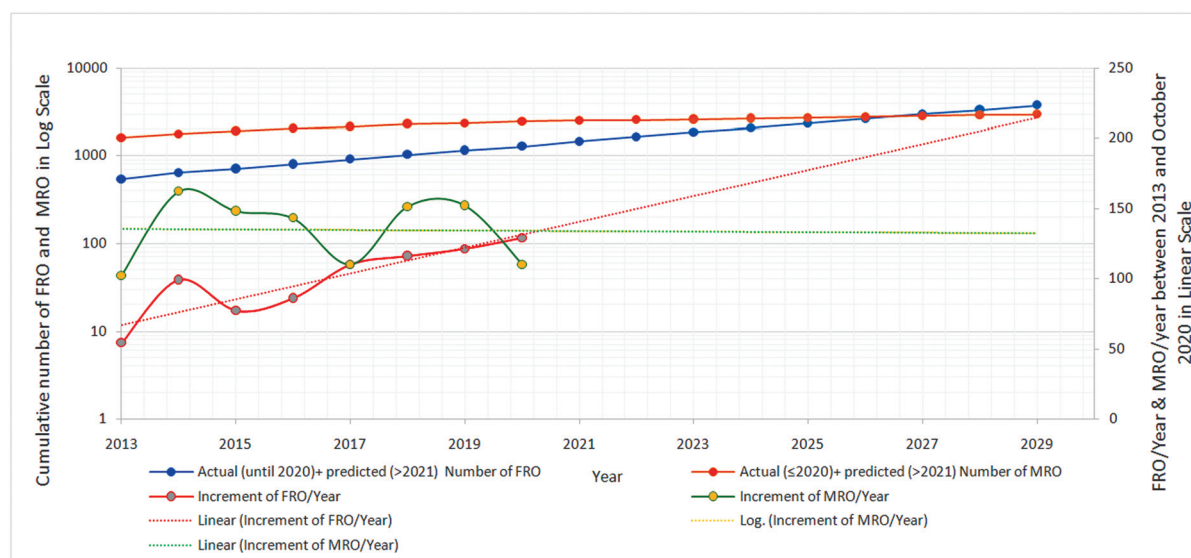


Fig. 1 Cumulative and differential representation of FROs and MROs and its forecast for the next decade (2030).

increased academic and research attributes.^{1,3} The best example, of a better working condition, is the elimination of stressful conditions and anxiety of the female worker who is either lactating mother and (or) mother of an infant who is unable to deliver proper child care being away from the child. With strict union government directives, only a handful of the institutions, public or private, are currently having a crèche facility.⁹ An increasing number of FROs and their occupancy in leadership positions may solve such issues. Moreover, better workplace environment incorporating a greater number of female co-workers and a proper childcare facility will eliminate the stress of mothers who are apprehensive about the quality of childcare and in turn, will lead to a higher level of productivity and better quality of work.

Historically, South Asia is one of the most gender unequal regions (gender inequality index 62), slightly above the middle east and North Africa (60) with the maximum gender equality seen in Western Europe.¹⁰ In all South Asian countries, patriarchal values and social norms keep gender inequalities alive in all subjects of social structure and professional fields. However, the perspectives about gender inequality are changing with, more women are participating in a subjects such as engineering, natural sciences, and medicine (ENM).¹¹ Such increased representation of women in ENM subjects is reflected by the encouraging increase of female representation in the Indian Radiation Oncology specialization, which is an encouraging sign.

Data Availability Statement

Data available with corresponding author, can be provided on request.

Conflict of Interest

None declared.

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