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Variations in Training of Surgical Oncologists: Proposal for a Global Curriculum

Are C, MD, MBA, FRCS, FACS[1] Caniglia A,[2] Malik Mohammed,[2] Charmaine Cummings[3], Carine Lecoq[4], Berman R MD, FACS[3], Audisio R, MD, FRCS[4] Wyld L B.Med.Sci.MB.ChB (hons), PhD, FRCS.

1. Division of Surgical Oncology, Department of Surgery, University of Nebraska Medical Center, Omaha, NE.
2. University of Nebraska Medical Center College of Medicine, Omaha, NE.
3. Society of Surgical Oncology
4. European Society of Surgical Oncology
5. Associate Chair for Surgical Education and Faculty Development, Chief Division of Surgical Oncology, Director Surgical Residency Training Program, Division of Surgical Oncology, Department of Surgery, New York University School of Medicine, New York, NY.
6. President European Society of Surgical Oncology, University of Liverpool, St Helens Teaching Hospital, St Helens, United Kingdom
7. Chair of the Education and Training Committee of European Society of Surgical Oncology, President of the British Association of Surgical Oncology, University of Sheffield, Jasmine Centre, Doncaster Royal Infirmary, United Kingdom.

Running head: Global variations surgical oncology training

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Corresponding author:

Chandrakanth Are, MD, MBA, FRCS, FACS
Jerald L & Carolynn J Varner Professor of Surgical Oncology & Global Health
Vice Chair of Education
Program Director General Surgery Residency
University of Nebraska Medical Center
Omaha, NE
USA. 68198
Phone: 402 559 8941
care@unmc.edu

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Synopsis:

The results of this study demonstrated significant global variations in surgical oncology training. These results call for a global curriculum in surgical oncology which has been developed by the Society of Surgical Oncology and the European Society of Surgical Oncology.

Variations in Training of Surgical Oncologists: Proposal for a Global Curriculum

Abstract:

Background: The global cancer burden is predicted to rise significantly over the next few decades. While there are several barriers to providing optimal cancer care on the global stage, some are related to the absence of an adequately trained workforce. This could be partly attributed to the significant global variations in the training of surgical oncology professionals. There are currently no published data mapping the training pathways for surgical oncologists for all countries in the world. The aims of this descriptive article are to report on the training paradigms in surgical oncology for all countries in the world and correlate the influence of economic standing on these training paradigms.

Materials and Methods: The training paradigms for all countries in the world was analyzed and categorized based on the six geographic World Health Organization regions and economic standing stratified by the Human Development Index.

Results: Data on the training paradigms was obtained for 174 countries from a total of 211 (82%). We noted extremely significant and concerning variations in the length, availability and structure of training paradigms depending on the geographic region and economic standing.

Conclusions: The results of our study demonstrated significant global variations in the training paradigms of surgical oncologists. These variations call for a global curriculum which has been developed by the Society of Surgical Oncology and the European Society of Surgical Oncology. It is hoped that this curriculum will serve a role in streamlining education to tackle the rising global cancer burden.

Variations in Training of Surgical Oncologists: Proposal for a Global Curriculum

Introduction:

The global cancer burden is expected to rise significantly over the next few decades. The cancer burden is estimated to increase from 14.1 million new cases and 8.2 million cancer-related deaths in 2012 to 23.9 million new cases and 14.6 million cancer-related deaths in 2035.[1] The recent publication by Sullivan and colleagues highlighted the significant deficiencies in tackling this rising global cancer burden.[2] While there are many barriers to providing optimal cancer care on the global stage, some factors relate to the lack of an adequately trained workforce of surgical oncologists.

This lack may be partly attributed to the significant global variations in surgical training requirements. Are and colleagues analyzed the training patterns of surgical oncologists globally using methodology that selected countries from each of the six geographic regions defined by the World Health Organization (WHO).[3] This research identified wide variations in global training recommendations, but only sampled a small proportion of countries which limits the validity of this research. There are currently no published data mapping the training pathways for surgical oncologists for all countries in the world.

The aims of this descriptive article are to 1. Report on the training paradigms in surgical oncology for all countries in the world and 2. Correlate the influence of economic standing on these training paradigms.

Materials and Methods:

The literature search for obtaining data pertaining to training and certification of surgical oncologists globally required extensive exploration of multiple websites related to global organizations (WHO, United Nations, Foundation for Advancement of International Medical Education and Research [FAIMER] database, etc.) as well as those of the individual countries.[4-163] Since there are no uniform standards for training surgical oncologists across the world, there does not exist one repository or one all-inclusive website of information for all countries. Information obtained from these multiple sources was used to develop an understanding of the training and certification of surgical oncologists globally.

Data on the following national demographic variables were collected: national population data, physician density, and inhabitants per physician ratio. The population data was collected using estimates from the Population Division of the United Nations Department of Economic and Social Affairs.[14] The physician density per one thousand people was collected using the most recent published estimates from The World Databank database.[15] The population was divided by one thousand, and then multiplied by the physician density value to arrive at the inhabitants per physician ratio.

Education and training data included in the review comprise: the length of time in years that it

takes to train a surgical oncologist, whether a fellowship is required, and if a trainee has to perform mandatory government service during or after surgical oncology training. Several variables comprised the total number of years in surgical oncology training, including premedical education, medical school, residency or postgraduate training, clerkship years, and fellowship length. If the completion of a medical degree necessitated the completion of internship years, those years were added to medical school training length, otherwise, they were added to residency length. Mandatory government service years, if applicable, were not added to the total years of training, due to the immense variation in time length and service requirements for different countries. The mandatory service years were gathered from the World Directory of Medical Schools (WDOMS).[165] Since many countries prefer surgeons to complete a fellowship before practicing as a surgical oncologist, but do not have the capacity to train them, fellowship length was added onto the total length of surgical oncologist training only if the fellowship was offered domestically. Specialization in surgical oncology was labeled in several different ways in different countries, including: gastroenterological surgery, oncologic surgery, surgery and oncology, cancer surgery, and general surgery with an oncologic focus.

The FAIMER database was one of the main sources used in this study. FAIMER is a non-profit organization aimed at improving global health by providing education, research, and information for health care workers worldwide. Within the FAIMER website, the International Medical Education Directory (IMED) was utilized to provide information about the duration of the curriculum, and website addresses of recognized medical schools in countries worldwide.[114] Most of the data on premedical education and residency length was found via the links on IMED to specific medical school websites. Google Translate was used to translate non-English languages for the sites that did not have an English language section. The Post Graduate Medical Education Project (PME) link through FAIMER was utilized to provide information on some of the countries' post-graduate education.[115]

The training paradigms for the entire world were reported according to the six geographic regions defined by the WHO.[3] The influence of economic standing on the training paradigms was analyzed by correlating the Human Development Index (HDI) to the presence of domestically offered surgical oncology fellowships. The HDI is a developmental statistic created by the United Nations Development Program and is composed of the three parameters of life expectancy, education, and income indices for a given country. Based on the HDI score, countries are placed in one of the three categories: High (> 0.71, High includes very High and High), Medium (0.53-0.71) and Low (< 0.53).[13]

Results:

The study attempted to obtain data from a total of 211 countries from the six WHO regions. It was possible to obtain data from 39/46 countries in the Africa region, 36/44 countries in the Americas region, 19/21 countries in Eastern Mediterranean region, 49/54 countries in the Europe region, 10/10 in the Southeast Asia region, and 21/36 countries in the Western Pacific region. Thus data was obtained for a total of 174 countries (82%). Countries whose data was not available were not factored into the calculations displayed in Figure 7.

The obtained data was initially analyzed to determine the minimum total training length in years (TTLY) offered domestically for training surgical oncologists for all the six WHO geographic regions and correlate it with their economic standing based on HDI (Figures 1-3). TTLY comprised of all years of education that included pre-medical education, medical school, residency or post-graduate surgical training and fellowship training. In Africa the average TTLY is 14.1 years, with a range of 10-17. The Americas region has an average TTLY of 13.8 years, with a range of 9.5(Guyana) to 17 years. The Eastern Mediterranean's average TTLY is 13.7 years with a range of 8(Sudan) to 16 years. The Western Pacific region's average TTLY is 13.4 years ranging from 9(Brunei Darussalam) to 17.5 years. Southeast Asia's average TTLY is 12.6 ranging from 9 (Maldives) to 16, and Europe's average TTLY is 14.1 with a range of 9 (Tajikistan) to 18 years. The N/A bar refers to countries that did not either offer medical training domestically, or concurrent data could not be found. Analysis of training length based on HDI revealed that for most regions except Africa and America, the TTLY increased with rising HDI.

The TTLY was further analyzed to obtain data specific to the average length of residency or post-graduate surgical training and fellowship training which was categorized based on the six WHO geographic regions and correlated to the HDI (Figures 4-6). The average length of residency or post-graduate training ranged from 3 to 7 years with extreme variations between the six WHO regions and even within each region based on HDI. The average length of fellowship training ranged from 1 to 3 years with similar extreme variations between the six WHO regions and even with each region based on HDI. Several Low HDI countries in the Americas, Eastern Mediterranean, Western Pacific and European region did not offer any domestic surgical oncology fellowship training.

We analyzed the number of countries offering surgical oncology fellowship training domestically and noted some general trends (Figure 7). With the exception of Africa and Southeast Asia regions, Low HDI countries in the remaining WHO regions did not offer domestic fellowship training. The number of countries offering domestic surgical oncology fellowship training in general showed a correlation with rising HDI. The rate of offering domestic surgical oncology fellowship ranged from 11% (Africa region) to 60% in the Southeast Asian region.

Similar widely varying trends were noted within each of the six WHO regions. In the Africa region, 1/28 (3.6%) of Low HDI countries, 3/8 (37.5%) of Medium HDI countries, and 1/2 (50.0%) of the High HDI countries offer domestic fellowships with an average length of 2.8 years. There are no Very High HDI countries in this region. Six of the 33 countries not offering fellowships domestically still require such fellowship training and send their physicians to Ghana, Nigeria, the UK, US, or Ireland to complete their education. In the Americas region, 0/1 (0%) of Low HDI countries, 0/6 (0%) of Medium HDI countries, 7/19 (36.8%) of the High HDI countries, and 4/10 (40.0%) offered domestic fellowship with an average length of 1.7 years. Twenty of the 25 countries not offering fellowships domestically still require them to be completed and the majority of these countries send their physicians to the United States for training, with a few countries partnering with Argentina, Chile, or Cuba. In the Eastern Mediterranean region, 0/3 (0%) of Low HDI countries, 3/5 (60.0%) of Medium HDI countries, and 4/9 (44.4%) of the High HDI countries offer domestic fellowship with an average length of 1.7 years. There are no Very High HDI countries in this region offering fellowship. Eight of the 10 countries not offering fellowships domestically still require fellowship training and these 8 countries outsource their

physicians to the UK (Palestine sends to Israel) to finish their training. In the European region, 0/5 (0%) of Medium HDI countries, 7/15 (46.7%) of the High HDI countries, and 21/29 (72.4%) of Very High HDI offer domestic fellowship with an average length of 1.7 years. There are no Low HDI countries in this region. Seventeen of the 21 countries not offering fellowships domestically still require the training and the majority of these countries send their physicians to complete their training elsewhere. Iceland sends their physicians to the UK, and some of the Eastern European countries rely on Russia as well. In the Southeast Asia region, 1/2 (50.0%) of Low HDI countries, 4/7 (57.1%) of Medium HDI countries, and 1/1 (100%) of the High HDI countries offer domestic fellowship with an average length of 1.8 years. There are no Very High HDI countries in this region. None of the 4 countries not offering fellowships domestically consider it a requirement for practice. In the Western Pacific region, 0/1 (0%) of Low HDI countries, 3/8 (37.5%) of Medium HDI countries, 3/3 (100%) of the High HDI countries, and 10/10 (100%) of Very High HDI countries offer domestic fellowship with an average length of 2.0 years. Three of the 6 countries not offering fellowships domestically still required them to practice as a surgical oncologist. These three countries send their physicians to Australia or New Zealand to complete their training.

Discussion:

The results of this descriptive and comprehensive study have demonstrated some extremely variable and concerning trends in surgical oncology training worldwide as outlined below:

- It is noted that surgical oncology training is extremely long
- The TTLY is extremely variable and can range from 8 to greater than 17 years
- There is extreme variability in the length of residency or post-graduate surgical training
- There is extreme variability in the length of surgical oncology fellowship training
- In general the length of training seems to have a positive correlation with rising economic standing based on HDI
- Not all countries in the world have the capability to offer surgical oncology fellowship training domestically.
- Several countries in the lower socio-economic strata do not have the capability to offer surgical oncology fellowship training domestically
- The likelihood of availability of domestic surgical oncology fellowship training has a positive correlation with rising economic standing based on HDI
- Several countries that do not offer domestic surgical oncology fellowships still consider such training a requirement and physicians from such countries are noted to travel to a wide variety of foreign countries to obtain the required training.
- There is also a wide variability in the location of foreign countries that the physicians travel to obtain the required training in surgical oncology.
- There are no structured pathways to integrate the knowledge acquired abroad into the native systems once the physician returns home
- In addition to variability between the six WHO geographic regions we also found extreme variations between countries within the same WHO region.

- There appear to be no uniform standards in the educational paradigms to train surgical oncologists between the six WHO geographic regions, within each of the WHO region and between countries of different economic standing based on HDI.

The findings of this study may have a significant bearing on how we address the rising global cancer burden and call for action on several fronts. One such front is addressing this wide variability in the training paradigms of surgical oncologists across the world. This extreme variability in the educational paradigms of surgical oncologist's worldwide is highly concerning and points to a lack of uniformity in training, certification and maintenance of competence of surgical oncologists. Such extreme variability could be a major stumbling block in our efforts to address the cancer burden on the global stage. While it is clearly understood that some differences in the training paradigms are absolutely inherent and essential to suit the local environment, the broad principles of how we treat cancer does not change regardless of the location in the world. Neither do the core educational principles of how we train a physician to provide care to patients with a cancer diagnosis and to perform oncologic procedures.

The results of this paper and alarming findings put forth by Sullivan et al [2], call for the leading surgical oncology societies in the world to step forward and develop a global curriculum in surgical oncology. The obligation to tackle the rising global cancer burden falls on every individual and every surgical oncology organization and no one can serve this role better than those societies that possess the needed academic and financial resources. The two leading and largest surgical oncology societies in the world, the Society of Surgical Oncology and the European Society of Surgical Oncology are ideally suited to shoulder the obligatory responsibility to develop a global curriculum in surgical oncology. A precedent for the development of such a global curriculum has been exemplified by the curriculum developed for medical oncology by the American Society of Clinical Oncology and European Society of Medical Oncology[164]. The Society of Surgical Oncology and European Society of Surgical Oncology have developed a proposal for Global Curriculum in surgical oncology which is published in these journals. It is fervently hoped that this proposed global curriculum in surgical oncology which would herald a major step in our efforts to address the rising global cancer burden.