

Clinical Oncology Workload in Sri Lanka: Infrastructure, Supports, and Delivery of Clinical Care

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PURPOSE Sri Lanka is a lower middle-income country undergoing a demographic transition with an increasing aging population. This has given rise to a higher burden of noncommunicable diseases including cancer. A well-trained oncology workforce is essential to address this growing public health challenge. Understanding the baseline status of the clinical oncology workforce is an essential step to improving cancer care delivery in Sri Lanka.

METHODS In this cross-sectional study, we distributed a web-based survey to all clinical oncologists in Sri Lanka. The survey captured data regarding clinical workload, demographic details, practice setting, and perceived barriers to quality patient care.

RESULTS A total of 41 of 54 oncologists responded to the survey, and all participants had training in clinical oncology. Thirty-seven (90%) of 41 oncologists treated both solid and hematologic malignancies, and the median duration of independent practice was 5 years. Almost two thirds of the oncologists (26 of 41, 63%) work at an academic center, and two thirds of the oncologists (27 of 41, 66%) work in both public and private sectors. A majority of the oncologists (26 of 41, 63%) were on-call 7 days per week. More than half of the oncologists saw over 400 new patient consults per year. With regard to barriers to quality patient care, most of the concerns relate to the scarcity of resources.

CONCLUSION This study sheds significant light about the clinical oncology workload landscape in Sri Lanka. Compared with other low- and middle-income countries, Sri Lankan clinical oncologists are faced with a very high workload, which may affect delivery of care.

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INTRODUCTION

Sri Lanka is a lower middle-income country (LMIC) with a population of around 21.8 million.¹ As Sri Lanka undergoes a demographic transition with an increasing aging population,² noncommunicable disease burdens, including cancer incidence, are increasing rapidly.³ An adequate, well-trained oncology workforce is essential to address this growing public health challenge. In Sri Lanka, clinical oncologists provide both medical and radiation oncology services and form the cornerstone of the cancer care system.

Sri Lanka has a free universal public health care system that covers the entire spectrum of oncology care, and it is complemented by a well-structured clinical oncology training program.⁴ However, the health system is plagued by chronic underfunding and rapidly escalating costs of care. These unique sets of circumstances have thrown up some significant challenges to clinical oncology workforce in the country.

Although data exist from high-income countries (HICs) regarding clinical oncology and medical oncology workload, such data are sparse from LMICs and nonexistent from Sri Lanka. Even in the 2017 study by Fundytus et al,⁵ which described the global workload of medical oncologists by surveying more than 1,000 medical oncologists from 65 countries, Sri Lanka was grossly underrepresented with only two oncologists participating.

Therefore, understanding the baseline status of the clinical oncology workforce is critically important in improving oncology services in Sri Lanka, and in this study, we set out to describe the clinical workload, demographic details, practice setting, and perceived barriers to quality patient care of clinical oncologists in Sri Lanka.

METHODS

We conducted a cross-sectional survey of oncologists in Sri Lanka using the online survey platform Qualtrics

ASSOCIATED CONTENT

Data Supplement

Author affiliations and support information (if applicable) appear at the end of this article.

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CONTEXT

Key Objective

To our knowledge, clinical oncology workload, workforce practice characteristics, and barriers to effective oncology service delivery in Sri Lanka have not been described to date.

Knowledge Generated

Our study found that Sri Lankan oncologists had a very high workload with majority seeing more than 400 new patient consults a year. They only have 15 minutes to spend with new patients and are on-call 7 days per week. Almost all oncologists were practicing in urban hospitals, and 66% work in both public and private settings. Surveyed oncologists felt that the major barriers affecting the delivery of high-quality care for patients were a lack of radiotherapy and diagnostic imaging services and shortages in chemotherapy stock.

Relevance

At a time when Sri Lanka is attempting to strengthen its health system to respond to the increasing burden of cancer, this study provides important insights on how to best prepare the clinical oncology workforce to meet these challenges.

TM⁶ to describe their demography, practice, and workload from October 2019 to March 2020.

Study Population

The study population comprised clinical oncologists who are board-certified in Sri Lanka (in Sri Lanka, these physicians are trained and practice both medical oncology and radiation oncology). During the study period, there were 54 clinical oncologists in Sri Lanka, and all these physicians were approached for this survey. Trainees were not included in this study.

Survey Design and Distribution

An online electronic questionnaire (Data Supplement) was developed to capture participant demographics, clinical training, clinical practice setting, clinical workload, delivery of chemotherapy and radiotherapy, and barriers to patient care. The survey was designed with multidisciplinary input from the study investigators. Most question fields were congruous with the recently published global survey for ease of comparison.⁵ A complete survey was piloted and subsequently revised on the basis of feedback from five Sri Lankan oncologists. The final survey had 51 questions and took 10-15 minutes to complete. The survey invitation was distributed by e-mail by the study's investigators S.G. and S.S. The listserv was created using the registry of clinical oncologists obtained through the Sri Lanka College of Oncologists. Each participant was provided with an anonymized electronic link to the survey by e-mail. The survey was distributed in October 2019. Two e-mail reminders were generated automatically to nonresponders, which went out in November and December 2019. The study was approved by the Research Ethics Board of University of Colombo, Sri Lanka. Informed consent was obtained from all participants. No human investigations were performed.

Statistical Analysis

The primary objective was to assess the workload of Sri Lankan oncologists. Workload was defined as the annual

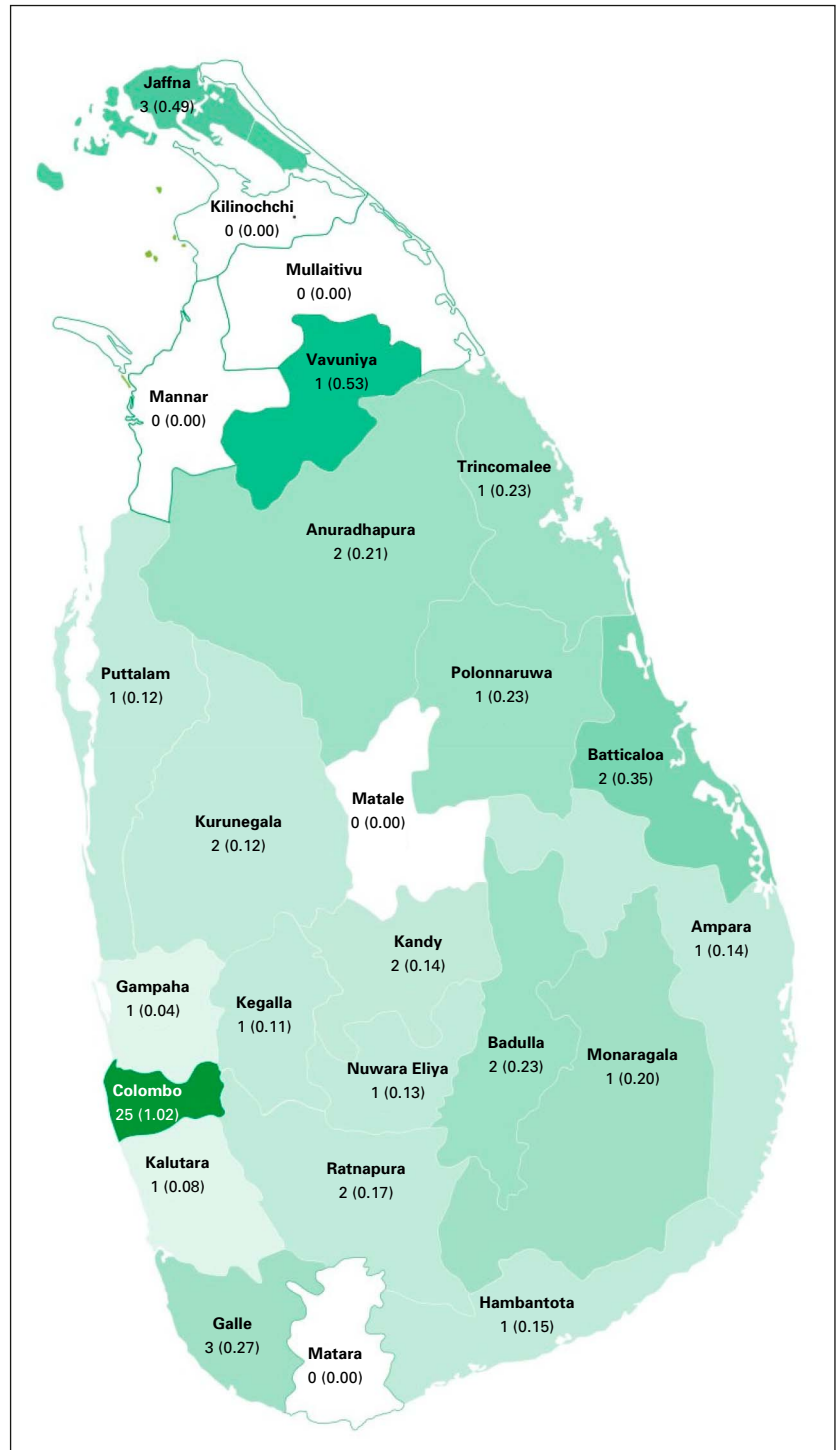
number of new cancer patient consults per oncologist. All data were initially collected in Qualtrics surveys and subsequently analyzed. Data consisted of categorical, ordinal, and continuous formats, occasionally collected as ranges (eg, < 10, 11-20, 21-30, etc). In the latter case, medians were generated using the midpoint of the categorical range (eg, a median value of 11-20 would be reported as 15). Information available through the global survey was used to compare information of oncologists in Sri Lanka with other LMICs, upper middle-income countries (UMICs), and

TABLE 1. Demographic Characteristics of Oncologists in Sri Lanka

Demographic Variable	No. (%)	Mean (SD)	Median
Both medical and radiation oncologists	41 (100)		
Medical oncologist	0		
Radiation oncologist	0		
Cancer treatment			
Solid tumors	2 (5)		
Hematologic malignancy	2 (5)		
Both solid and hematologic	37 (90)		
Years in independent clinical practice		7.6 (6)	
Age, years		46.5 (67)	46
Sex			
Male	25 (64)		
Female	16 (36)		
Percentage of work			
Clinical practice		71.4 (12)	
Research		6.3 (6)	
Education and teaching		13.2 (8)	
Administrative duties		9.1 (8)	

NOTE. n = 41 unless otherwise specified.
Abbreviation: SD, standard deviation.

FIG 1. Distribution of primary practice location of all clinical oncologists (including 13 nonresponders) in Sri Lanka by district in 2019. The value in parenthesis denotes the number of oncologists per 100,000 people of that district (on the basis of the 2019 population estimates of the Sri Lanka Department of Census and Statistics).⁷ Clinical Oncology Workforce in Sri Lanka—Current status and gearing to meet future challenges.



globally.⁵ We contacted the authors of this study to obtain their survey results to obtain comparator estimates. Pearson chi-squared tests were used to test categorical variables for differences in proportions, and the Mann-Whitney U-test was used to compare ordinal and continuous data. A *P* value of < .05 was deemed statistically significant. No adjustments were made for multiple comparisons. Anonymity has been maintained throughout the conduct of the study and during reporting of the results.

RESULTS

Survey Distribution and Response

Fifty-four clinical oncologists were invited to participate; 41 oncologists completed the survey, with an overall response rate of 76%.

Demography of Clinical Oncologists

The demographic composition of our Sri Lankan oncologist cohort can be found in [Table 1](#). In brief, the median age of

TABLE 2. Practice Setting of Oncologists in Sri Lanka

Variable	No. (%)
Practice location	
Academic center	26 (63)
Hospital-based practice	25 (61)
General hospital	13 (52)
Cancer hospital (outpatient only)	12 (48)
Cancer hospital (inpatient and outpatient)	30 (73)
No. of beds (n = 30)	
0-10	0 (0)
11-20	1 (3)
21-50	4 (13)
51-100	10 (33)
> 100	15 (50)
Health care system	
Both public and private	27 (66)
Public	13 (32)
Private	1 (2)
Location	
Urban	37 (90)
Rural	4 (10)
Other services on-site	
Palliative care	32 (78)
Radiotherapy	23 (58)
Electronic medical records	3 (7)
Training details at site of practice	
Clinical oncology training at site	13 (32)
Supervision of trainees	15 (37)
Clinical notes	
Handwritten clinic notes	40 (98)
Dictate notes	0 (0)
Type clinic notes	1 (2)

NOTE. n = 41 unless otherwise specified.

respondents was 46 years, and 64% were male. As expected, all participating oncologists had training in both medical oncology and radiation oncology with 10 oncologists practicing pediatric oncology (24%) as well. Thirty-seven (90%) of 41 oncologists treated both solid and hematologic malignancies. The median duration of independent practice was 5 years. The Sri Lankan oncologists' workload composition was predominantly clinical (mean [standard deviation] 71% [$\pm 12\%$] of total working time) and mean research time accounted for 6% ($\pm 7\%$). All oncologists were initially trained locally in Sri Lanka and then traveled abroad for advanced training. Respondents spent a median duration of 7 years postgraduate training (after medical school) in oncology. Twenty of 41 respondent oncologists (48%) pursued additional training beyond core oncology training, all of which were clinical.

Clinical Practice Setting

The primary practice location for the majority of participating oncologists was the Colombo district (17 of 41 [41%]; Fig 1). Almost two thirds of the oncologists (26 of 41, 63%) work at an academic center. Two thirds of oncologists (27 of 41, 66%) work in both public and private sectors. Palliative care services were available in 78% of oncologists' primary practice locations. However, radiotherapy services are available to just over half of the oncologists (24 of 41, 58%). The majority (40 of 41, 98%) had access to handwritten clinic notes only (Table 2).

Workload of Oncologists

The median number of oncologists at their primary practice location ranged between 2 and 5. A majority of the oncologists (26 of 41, 63%) were on-call 7 days per week. The median duration worked per week was 45 hours. The median number of patient consults seen by an oncologist per year was 475. New patient consults were seen the same day by most oncologists (32 of 41, 78%). The median number of clinic patients seen per day was 35, higher than other counterparts. The median time spent with a new patient consult was 15 minutes (Table 3.)

Delivery of Chemotherapy and Radiotherapy

A majority of oncologists provide both chemotherapy and radiotherapy in their clinical practice (33 of 41, 79%). Eight of 41 (20%) oncologists did not have access to radiotherapy. Approximately one in two new patient consults receives both chemotherapy and radiotherapy (median 50% for both chemotherapy and radiotherapy). The oncologists discussed the prognosis with the patients in majority of the first visits (median 85%). Cobalt 60 radiotherapy machines were the most common radiotherapy machines used by participants (14 of 41, 35%) followed by linear accelerators (11 of 41, 26%). The median time range to start radiotherapy from initial patient consult for both curable and noncurable cancers was 1-2 weeks. The median time range to travel to a radiotherapy site when the practice location of the oncologist did not have radiotherapy was between 2 and 4 hours (Table 4).

Barriers to Effective Patient Care

Figure 2 summarizes barriers to effective patient care perceived by the participating oncologists of this survey. Most of the concerns relate to the scarcity of resources. Unavailable or limited access to radiotherapy (24 of 41, 58%), diagnostic imaging (20 of 41, 49%), and chemotherapy (11 of 41, 27%) were recurring issues, followed by inadequate salary or need to supplement salary with private practice, and patients unable to pay for supplementary treatment, diagnostic imaging, and/or pathology.

Training Details

All oncologists completed their core training in Sri Lanka (41 of 41). The median number of training years after medical school was 12.6 years, the majority of which were

TABLE 3. Workload of Sri Lankan Clinical Oncologists

Characteristic	No. (%)	Median
No. of CO working in the practice location		2-5
1	13 (32)	
2-5	15 (37)	
6-10	0 (0)	
11-15	11 (27)	
16-20	2 (5)	
> 20	0 (0)	
Type of call		
Oncology	32 (78)	
Internal medicine	0 (0)	
Both	9 (22)	
On-call days per week		7
< 2	0 (0)	
3-4	5 (12)	
5-6	10 (24)	
7	26 (63)	
Hours of work per week		45
< 30	0 (0)	
31-50	21 (52)	
51-70	10 (24)	
> 70	10 (24)	
Weeks of paid leave per year		3-4
0	8 (19)	
1-4	22 (54)	
> 5	11 (27)	
Weeks of academic leave per year		0
0	24 (59)	
1-2	12 (29)	
3-4	5 (12)	
No. of new patient consults per year		401-500
< 200	8 (20)	
201-500	14 (34)	
501-1,000	13 (32)	
> 1,000	6 (15)	
Wait time for a new consult to be seen after referral, days		Same day
Same day	32 (78)	
< 4	7 (17)	
4-7	2 (4.9)	
Total No. of patients seen per day (outpatient)		35
< 10	2 (5)	
11-30	16 (39)	
31-50	11 (27)	
51-100	4 (10)	
> 100	3 (7)	

(Continued in next column)

TABLE 3. Workload of Sri Lankan Clinical Oncologists (Continued)

Characteristic	No. (%)	Median
Time spent with a new patient, minutes		15
< 10	8 (20)	
11-20	24 (58)	
21-40	9 (22)	
> 40	0 (0)	
Time spent with a patient on active treatment, minutes		7.5
> 10	21 (52)	
10-30	17 (41)	
> 30	3 (7)	
Time spent with a follow-up patient, minutes		7.5
< 5	12 (29)	
5-10	23 (56)	
> 10	6 (15)	
Clinical volume inhibits quality of care		
Strongly disagree	4 (10)	
Disagree	13 (32)	
Neutral	11 (27)	
Agree	9 (22)	
Strongly agree	4 (10)	

NOTE. n = 41 unless otherwise specified.

Abbreviation: CO, clinical oncologist.

specific to oncology training (median = 10.4). None of the participating oncologists participated in research training after medical school.

DISCUSSION

There are several findings from this study that are worth highlighting. Although a majority of the oncologists in Sri Lanka treated both solid and hematologic malignancies, almost two thirds of the oncologists (26 of 41) work at an academic center and two thirds of oncologists work in both public and private sectors (27 of 41). A majority of the oncologists were on-call 7 days per week with no downtime. More than half of the oncologists treated over 400 new patient consults per year. With regard to barriers to quality patient care, most of the concerns relate to the scarcity of resources.

We are aware of two studies that have evaluated oncologist workload in the global context: a cross-sectional survey of medical oncologists conducted by Fundytus et al⁵ and the review of published literature on the global oncology workforce by Mathew.⁸ Both studies identified a wide disparity of clinical oncologist workload regarding the countries' income level, with the lower the country's income, the higher the workload. However, a majority (> 80%) of participants in the survey by Fundytus et al were medical oncologists. Similar to our study, the authors used

TABLE 4. Details on Provision of Chemotherapy and Radiation Therapy Among Clinical Oncologists in Sri Lanka

Characteristic	No. (%)	Median
Type of therapy offered in practice		
Chemotherapy only	8 (19)	
Radiotherapy only	0 (0)	
Both chemotherapy and radiotherapy	33 (79)	
Nether chemotherapy nor radiotherapy	1 (2)	
Site-specific cancer therapy	3 (7)	
Percentage of new consults receiving chemotherapy		50
0-20	0 (0)	
21-40	8 (20)	
41-60	15 (37)	
61-80	15 (37)	
81-100	0 (0)	
Percentage of new consults receiving radiotherapy		50
0-20	5 (12)	
21-40	15 (37)	
41-60	18 (44)	
61-80	3 (7)	
81-100	0 (0)	
Proportion of patients (as percentage) you discuss prognosis with (n = 40)		
0-10	2 (5)	
11-30	7 (18)	
31-50	5 (18)	
51-70	3 (7)	
71-90	11 (28)	
> 90	12 (30)	
Type of radiotherapy provided		
Cobalt 60	22 (35)	
Linear accelerators	16 (26)	
IMRT	14 (23)	
Other	10 (16)	
Wait time to start radiation for curable cancers (n = 23), weeks		
< 1	4 (17)	
1-2	8 (35)	
2-3	3 (13)	
3-4	4 (17)	
> 4	4 (17)	
Wait time to start radiation for incurable cancers (n = 23), weeks		
< 1	9 (39)	
1-3	10 (43)	
3-5	3 (13)	
> 5	1 (4)	
Hours of travel when radiation not available in practice site (n = 17)		
< 1	1 (6)	
1-2	6 (35)	
2-4	9 (53)	
> 4	1 (6)	

NOTE. n = 41 unless otherwise specified.

Abbreviation: IMRT, Intensity Modulated Radiotherapy.

a cross-sectional design, and we believe the main domains examined in this study were valid for meeting our study's objectives. We also compared our study's findings with what has been published by Fundytus et al to provide context to our results.

The most striking finding to emerge from this study is the very high workload of clinical oncologists in Sri Lanka. Sri Lankan oncologists receive approximately 475 new patient consults a year and see an average of 35 patients per day. This is higher than 425 and 25 patient consultants and average patients seen per day, respectively, in other LMICs and substantially higher than 175 and 25 seen in HICs.⁵ In Sri Lanka, there is no appointment system for clinic patients. All internal (within the institution) or external (from other institutions) referral patients present themselves to clinics without awaiting appointments. Since most have traveled long distances, they are seen on the same day as the first presentation. The absence of an appointment system has proved beneficial to patients by reducing wait times to a minimal interval. Consequently, it has also resulted in an increased clinical workload.

More than two thirds of oncologists provide on-call services all 7 days per week. The high workload is most likely the reason for the relatively less time spent at new patient consults compared with HICs (25 minutes in LMICs, 35 minutes in UMICs, and 25 minutes globally, $P < .0001$). In Sri Lanka, the average time spent on a new patient consult is 15 minutes, substantially lower than the other LMICs. The range of cancers treated may also contribute toward their high workload. Thirty-seven (90%) oncologists treated both solid and hematologic malignancies in contrast to 68% in LMICs, 49% in UMICs, and 27% globally ($P < .001$). However, it is interesting to note that 95% of these new patient consults were seen within 3 days of the referral and 78% on the same day. This is much higher than other counterparts (25 in LMICs, 25 in UMICs, and 25 globally, $P < .0001$).

Two thirds of the oncologists (27 of 41, 66%) work in both public and private sectors, in contrast to other regions across the world (28% in LMICs, 43% in UMICs, and 20% globally $P < .001$). Owing to the low remuneration levels of public sector doctors in Sri Lanka, many specialists supplement their government salaries by working in the private sector after hours. This practice is not limited to clinical oncology only.

Sri Lanka has an established pediatric oncology service separate from clinical oncology services. Ten oncologists practiced pediatric oncology (24%), which was a higher percentage than other regions and globally ($P < .001$). However, almost all of them would be treating only older children belonging to an age range of 15-19 years who still technically belong to the pediatric age group.

Although all clinical oncologists undergo a structured training program in Sri Lanka and abroad in both medical oncology and radiation oncology, only 58% of clinical

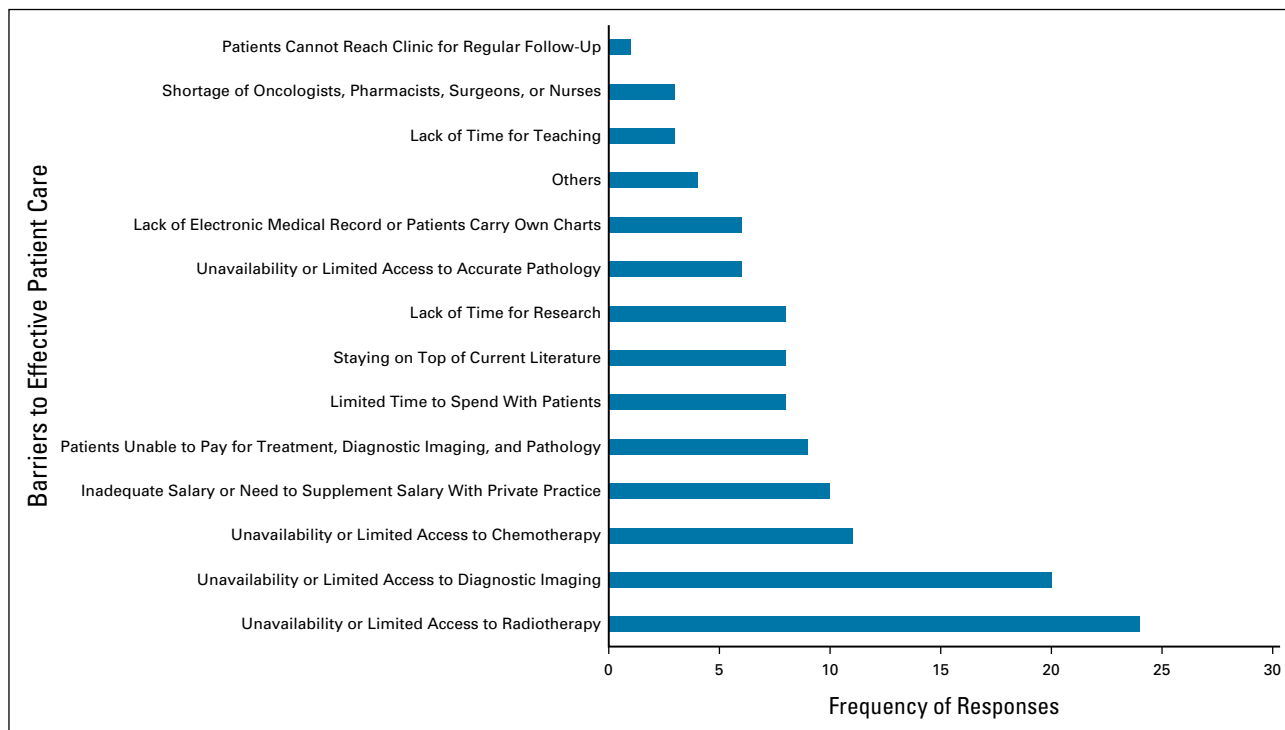


FIG 2. Perceived barriers to effective patient care among clinical oncologists in Sri Lanka. Other—lack of a proper base for research, ad hoc basis of patient referral, and lack of multidisciplinary meetings.

oncologists had access to radiotherapy facilities in the public health system. This is a stark contrast to other country income regions (80% in LMICs, 72% in UMICs, and 83% globally, $P < .001$). This is because, at the time of the study, only six of 23 oncology treatment centers in the country had radiotherapy facilities.⁴ Owing to this reason, 42% of clinical oncologists worked only as medical oncologists, a gross waste of a highly trained, extremely scarce resource. In the six available radiotherapy centers, numbers exceeded 550 new patients per oncologist while a majority of nonradiation centers operate at 300 new patients per oncologist. This further highlights the problem of inefficient distribution of workforce. A lack of radiotherapy facilities was identified as the most important barrier to good quality health care as perceived by the study participants. Therefore, improvements in radiotherapy services should be given priority in future expansion of radiotherapy services in Sri Lanka.

Although 22 of 25 administrative districts in Sri Lanka had at least one clinical oncologist, Colombo district had the highest number with 17. This is because Sri Lanka's only dedicated cancer hospital is situated in the Colombo district, which also has the highest population density.

This study identified that only 6% of the time of study participants was spent in research activities. The main reason for this is may be the high clinical workload. However, lack of a research culture, opportunities for formal training, and professional or financial incentives to produce research output are likely to be contributing factors. Additionally, very

few oncologists had access to electronic medical records (3 of 41, 7%) compared with other income regions (82% in LMICs, 46% in UMICs, and 36% globally, $P < .001$).

This study provides baseline data to inform future expansion of clinical oncology services in Sri Lanka. A maximum return on investment for the training of clinical oncologists can be achieved only if they are provided adequate resources to provide medical and radiation oncology services. This highlights the need for a balance between opening new centers to ease the burden on already established oncology treatment centers and providing enough resources to the new centers to make the most efficient use of the skills of the clinical oncologists placed in there.

This study has several limitations. Although we had a 76% response rate for our survey, the responders might not be truly representative of all clinical oncologists in Sri Lanka. Sri Lankan hospitals do not have a robust record-keeping system. Therefore, workload data reported by the survey participants might not accurately reflect the true ground situation. Clinical oncologists are key players in cancer care delivery, but there are many other important actors including surgeons, nurses, support care workers, and radiotherapy technologists who play important roles. Therefore, assessing oncology workforce workload only through clinical oncologists might give a warped picture. As available literature on clinical oncology workforce is very sparse, most of the comparisons were performed with the findings of Fundytus et al on medical oncology. However,

owing to inherent differences in the two disciplines, these comparisons might not be highly accurate.

In conclusion, this study sheds significant light about the clinical oncology workload landscape in Sri Lanka. Compared with other LMICs, Sri Lankan clinical oncologists are

faced with a very high workload and that might have an impact on service delivery. This study also highlights the potential for a more efficient use of available human resources and lays the foundation for further studies on how best to further expand oncology services in Sri Lanka.

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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

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No potential conflicts of interest were reported.

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