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Cancer burden across the South Asian Association for Regional Cooperation in 2022

Urvish Jain ,[1] Faraan Rahim,[2] Bhav Jain ,[3,4] Abhinav Komanduri,[5] Aditya Arkalgud,[6] Cameron John Sabet,[7] Alessandro Hammond,[8] Phub Tshering,[9] Tej A Patel ,[10] Bhawna Sirohi ,[11] Pankaj Jain,[12,13] Shah Zeb Khan,[14] Sanjeeva Gunasekera,[15,16] Ramila Shilpakar,[17] Zabihullah Stanikzai,[18] Arman Reza Chowdhury,[19] Nishwant Swami,[20,21] Edward Christopher Dee,[22] Bishal Gyawali[23]

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For numbered affiliations see end of article.

Correspondence to
Dr Bishal Gyawali;
gyawali.bishal@queensu.ca

ABSTRACT

Objective The objective of this study is to present a cross-sectional analysis of cancer burden in the South Asian Association for Regional Cooperation (SAARC) region and explain unique characteristics of its cancer burden as compared with the rest of the world.

Methods and analysis Using publicly available data from the Global Cancer Observatory (GCO) and the World Bank, we collected cancer statistics and population statistics for Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka from 2017 to 2022.

Results The number of newly diagnosed cases in the region was 1 846 963, representing 9.3% of the incidence worldwide. As defined by the GCO, the crude incidence rate (CIR) (per 100 000) of cancer in SAARC was 97.3 compared with the worldwide rate of 235.5. The crude mortality rate (per 100 000) in SAARC was 63.4, compared with 123.6 globally. However, the mortality to incidence ratio (MIR) (per 100 000) was 0.65, compared with 0.49 globally.

Conclusion Our research highlights SAARC's unique cancer landscape with low incidence (CIR) and mortality (CMR) but elevated MIR compared with global figures. These findings underscore the need for a united, contextually relevant approach to addressing the burden of cancer in SAARC. In particular, investment in collaborative, tailored cancer care programmes will build the SAARC region's capacity to address the growing cancer challenge.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Challenges for cancer control in the diverse South Asian Association for Regional Cooperation (SAARC) contexts include late diagnosis and poor outcomes because of poor access to and affordability of diagnostics and treatments including medications, radiation, and surgery, and cultural stigmas and misconceptions.

WHAT THIS STUDY ADDS

⇒ Our study reconciles these documented oncological challenges with recent epidemiological data from the region and outlines and describes the challenges within the context of each SAARC country's political and cultural landscape.

⇒ Our study also quantifies and describes the disparities between male and female cancers in SAARC, an important distinction to be made due to cultural stigmas and socioeconomic barriers that have historically impeded women's access to cancer screening and treatment in the region.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ These findings suggest that greater clinical research funding, grassroots advocacy efforts, and region-specific policies are necessary to help alleviate the growing burden of cancer in SAARC.

INTRODUCTION

Cancer is the second-leading cause of death in low-income and middle-income countries (LMICs) and the leading cause of death in high-income countries.[1] In 2022, there were an estimated 19.9 million new cancer cases globally, which is expected to rise by 43% to 28.4 million cases by 2040. In addition, this significant rise in cancer cases primarily impacts LMICs that are already grappling with the challenge of developing sustainable infrastructure for cancer control.[2] Not only do LMICs account for a staggering 57% of cancer cases, but they also experience higher mortality rates, contributing to nearly two-thirds of cancer deaths globally.[3]

South Asia accounts for almost a quarter of the world's population, and it is composed of eight LMICs, including Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka. The region is also commonly referred to as the South Asian Association for Regional Cooperation (SAARC).[4] While the SAARC region accounts for 9.3% of new cancer cases, it faces a disproportionate

cancer mortality burden, with over 12% of total deaths globally.[2] The relatively lower racial/ethnic heterogeneity within the SAARC region may make it distinct from other world regions, and the healthcare systems throughout SAARC are somewhat comparable.[5]

Given this context, understanding the burden of cancer in this region as a whole will be essential to devise a common regional strategy that addresses the needs of patients with cancer in this region. In this article, we estimate the burden of cancer in the SAARC region based on data from the 2022 Global Cancer Observatory (GCO).

MATERIALS AND METHODS

A project of the International Agency for Research on Cancer (IARC), GCO is an online platform that aims to provide policy-makers, health professionals, and the general public with accurate information on the global burden of cancer, including cancer statistics from countries worldwide.[6] Using the GCO and its data metric definitions, we obtained the following data for each country across the SAARC region and the world: incidence, defined as the number of new cases of a disease that occur within a defined population during 2022; mortality, defined as the number of deaths that occurred in 2022; crude incidence rate (CIR) per 100 000, defined as the proportion of individuals who developed cancer in 2022; crude mortality rate (CMR) per 100 000, defined as the proportion of individuals in a population who died from cancer in 2022; age-standardised incidence rate (ASIR) per 100 000, defined as the weighted average of the age-specific incidence rates; age-standardised mortality rate (ASMR) per 100 000, a weighted average of the age-specific mortality rates; and 5-year prevalence of cancer in total cases, the total number of people who have a disease at any time between 2017 and 2022.

Through the World Bank, we obtained total, male, and female population numbers for each country. Incidence, mortality, and 5-year prevalence rates for the aggregate region were calculated based on the sum of the absolute case, death, and prevalence numbers across all countries in SAARC. Regional CIR, CMR, ASIR, and ASMRs were calculated using a weighted average of each country with respect to its population. Mortality-to-incidence ratio (MIR) was calculated for each country, the total region and the world by dividing the number of deaths over the number of incident cases. The same process was repeated separately for males and females. Crude rates were used to report general data on each country. ASIR and ASMR estimates allow comparison of cancer incidence and mortality rates across tumour types, sex, and country, as these estimates adjust for differences in population distribution by age. MIR was used because it allows a high-level comparison of inequities in cancer outcomes and international comparison of survival across countries due to the relatively easier availability of incidence and mortality data.[7] We also compiled the 10 most common cancers by ASIR and most common cancers by ASMR for both males and females.

The year 2022 was chosen as the year of analysis for this study because it is the most recent year in the data compilation. Data are presented descriptively and were analysed using Excel. Patients and the public were not involved in the design, conceptualisation, data, writing, or review of this manuscript.

RESULTS

Table 1 depicts the 2022 population statistics of cancer in the SAARC region. The population of SAARC in 2022 was estimated to be 1 919 347 997, accounting for 24.1% of the world population. The number of newly diagnosed cases in the region represented 9.3% of the incidence worldwide. The ASIR (per 100 000) of cancer in SAARC was 100.1, compared with the worldwide rate of 196.9. The greatest ASIR was in Sri Lanka at 106.9, compared with the lowest in Nepal with 72.8.

Total cancer deaths in SAARC represented 12.4% of all cancer deaths globally. The ASMR (per 100 000) in SAARC was 65.9, compared with 91.7 globally, and the MIR (per 100 000) was 0.65, compared with 0.49 globally. ASMR was greatest in Afghanistan with a rate of 78.7, and it was lowest in Nepal with a rate of 55.3. Finally, the greatest MIR was 0.75 in Bhutan, and the lowest was 0.50 in the Maldives (Figure 1).

The ASIR for males and females is 99.8 and 101.1, respectively. The majority of cancer deaths in the region occurred in males (51.8%). Finally, the MIR for SAARC females was 0.62, compared with 0.68 in SAARC males (Table 1).

Table 2 highlights the 10 most common types of cancers in the region. Breast cancer had the highest incidence as well as mortality rates in females, whereas lip/oral cavity cancer had the highest incidence but lung cancer had the highest mortality among males in the region. All ASIRs by cancer site and sex are indicated in Figure 2. Table 3 depicts the five most common cancer sites by country in the region.

DISCUSSION

Using data from the GCO, we show that the SAARC region had a lower age-standardised incidence and mortality of cancer (ASIR of 100.1 and ASMR of 65.9) than that of the world (ASIR of 196.9 and ASMR of 91.7), but the region still had a higher MIR than that of the global population (0.65 compared with 0.49). Given that cancer statistics vary widely across the region, with CIR ranging from 59.6 to 154.1, ASIR ranging from 72.8 to 106.9, CMR ranging from 41.5 to 88.7, ASMR ranging from 55.3 to 78.7, and MIR ranging from 0.50 to 0.75, these findings can help the SAARC nations devise cancer control strategies both nationally and regionally in collaboration with each other.

Afghanistan

Perhaps contributing to one of the highest ASMRs (81.0 and 77.5) and ASIRs (103.6 and 110.7) in

Table 1 2022 population statistics of cancer in the SAARC countries

Countries	Population no.*	Incidence	CIR	ASIR	T. deaths	CMR	ASMR	5-year prevalence	MIR
All									
Afghanistan	41 128 771	24 275	59.6	106.2	16 923	41.5	78.7	48 227	0.70
Bangladesh	171 186 372	167 256	99.6	105.6	116 598	69.5	74.7	346 337	0.70
Bhutan	782 455	638	81.0	87.6	480	60.9	67.2	1246	0.75
India	1 417 173 170	1 413 316	100.5	98.5	916 827	65.2	64.4	3 258 518	0.65
Maldives	523 787	479	88.5	105.3	241	44.6	58.8	1321	0.50
Nepal	30 547 580	22 008	72.8	72.8	14 704	48.7	55.3	44 803	0.67
Pakistan	235 824 862	185 748	80.9	105.6	118 631	51.7	69.8	390 443	0.64
Sri Lanka	22 181 000	33 243	154.1	106.9	19 145	88.7	59.0	86 508	0.58
Total	1 919 347 997	1 846 963	97.3	100.1	1 203 549	63.4	65.9	4 177 403	0.65
World	7 950 946 800	19 898 018	235.5	196.9	9 704 040	123.6	91.7	53 325 878	0.49
Female									
Afghanistan	20 362 329	13 036	65.7	110.7	8561	43.1	77.5	27 192	0.66
Bangladesh	86 327 159	72 334	87.1	89.5	48 007	57.8	60.9	164 393	0.66
Bhutan	368 525	282	76.6	84.5	200	54.3	61.2	613	0.71
India	685 992 675	722 138	106.8	100.8	446 772	66.1	62.6	1 788 471	0.62
Maldives	222 471	231	113.7	111.3	91	44.8	48.8	718	0.39
Nepal	15 901 334	12 216	75.4	80.7	7768	48.0	52.5	26 615	0.64
Pakistan	116 863 982	98 180	88.1	111.8	59 697	53.6	70.8	216 367	0.61
Sri Lanka	11 498 234	17 510	155.7	106.0	9325	82.9	52.6	50 036	0.53
Total	937 536 709	935 927	101.8	101.1	580 421	63.2	63.5	2 274 405	0.62
World	3 954 425 850	9 626 415	247.2	186.4	4 294 644	110.3	76.8	27 663 570	0.45
Male									
Afghanistan	20 766 442	11 239	53.8	103.6	8362	40.0	81.0	21 035	0.74
Bangladesh	84 859 213	94 922	112.0	120.8	68 591	80.9	87.8	181 944	0.72
Bhutan	413 930	356	84.8	90.5	280	66.7	72.4	633	0.79
India	731 180 498	691 178	94.6	97.1	470 055	64.3	66.5	1 470 047	0.68
Maldives	301 315	248	73.4	107.1	150	44.4	68.5	603	0.60
Nepal	14 646 246	9792	69.8	81.6	6936	49.4	58.1	18 188	0.71
Pakistan	118 960 880	87 568	74.2	99.5	58 934	49.9	68.8	174 126	0.67
Sri Lanka	10 682 766	15 733	152.4	110.6	9820	95.1	67.8	36 472	0.62
Total	981 811 290	911 036	93.0	99.8	623 128	63.6	68.7	1 903 048	0.68
World	3 996 520 940	10 271 603	259.7	212.7	5 409 396	136.8	109.8	25 662 308	0.53

*Population numbers from World Bank.
ASIR, age-standardised incidence rate; ASMR, age-standardised mortality rate; CIR, crude incidence rate; CMR, crude mortality rate; MIR, mortality-to-incidence ratio; SAARC, South Asian Association for Regional Cooperation; T, total.

SAARC for males and females, respectively, cancer control in Afghanistan is highly underequipped because of political unrest and turmoil over the last four decades. Even prior to the Taliban seizure of power, Jamhuriyat Hospital in Kabul, Ali Abad Teaching Hospital and two medical oncology units in Mazar Sharif and Heart Province served as the lone cancer referral centres in a country of over 41 million. However, due to poor access to diagnosis and little documentation outside of Jamhuriyat Hospital, these data may be significantly under-reported.[8] Despite having a National Cancer Control Plan and even a cancer care registry, cancer has long been significantly neglected as acute food shortages and a severe shortage of essential medical facilities and pharmaceuticals have plagued the country.[9] The lack of care for non-communicable diseases in Afghanistan is only likely to get worse in a Taliban-led Afghanistan, especially for women and those in dire need of humanitarian support from outside governments and organisations.[10]

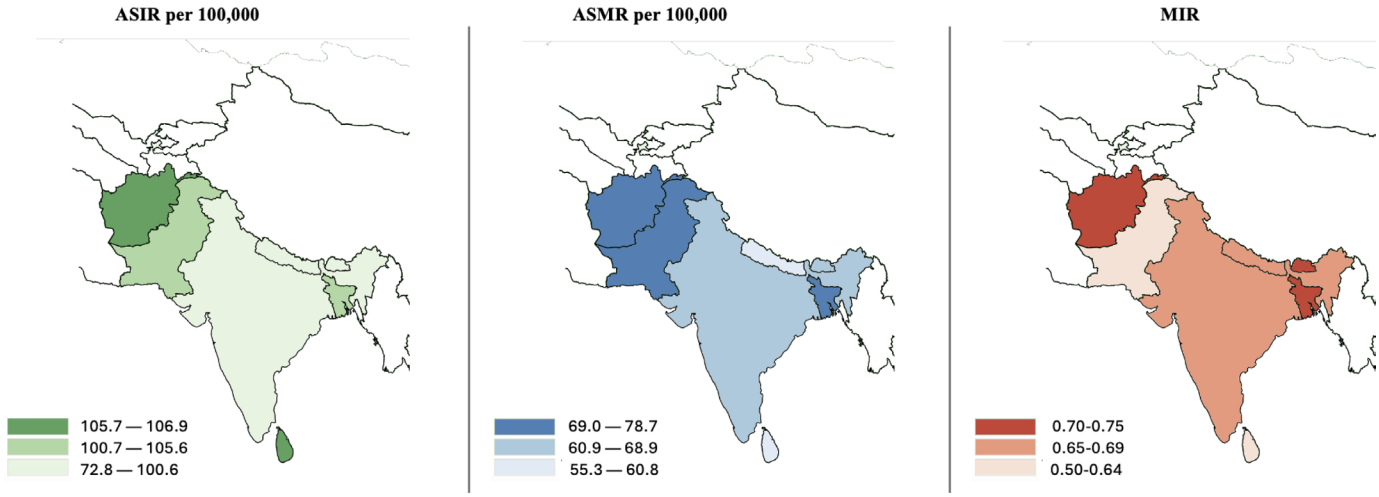

Figure 1 ASIR/ASMR/MIR of SAARC Countries. ASIR, age-standardised incidence rate; ASMR, age-standardised mortality rate; MIR, mortality-to-incidence ratio; SAARC, South Asian Association for Regional Cooperation.

Bangladesh

In Bangladesh, the sex disparity in ASIRs (120.8 and 89.5) and ASMRs (87.8 and 60.9) for men and women, respectively, represents a greater burden on males and is likely linked in part to higher smoking rates among men compared with women.[11] Further studies in Bangladesh must be done to better understand the specific factors at play leading to this marked disparity, especially in the aftermath of the implementation of the country's National Cancer Control Strategy and Action Plan, cancer early detection programmes, and cancer registry.[11] Bangladesh also has no national human papillomavirus virus (HPV) vaccination and cervical cancer screening programme. As such, no

Table 2 2022 SAARC countries: cancer sites, statistics, and MIRs for females/males

Top 10 cancers	Incidence in SA	ASIR	Mortality in SA	ASMR	MIR in SA	MIR
Females						
1	Breast	26.3	Breast	13.6	Liver	0.95
2	Cervix uteri	15.8	Cervix uteri	10.0	Pancreas	0.94
3	Ovary	6.2	Ovary	4.4	Oesophagus	0.94
4	Lip, oral cavity	5.2	Oesophagus	4.1	Lung	0.91
5	Oesophagus	4.3	Lip, oral cavity	3.0	Stomach	0.88
6	Colorectum	3.9	Lung	3.0	Mesothelioma	0.87
7	Lung	3.2	Stomach	2.7	Multiple myeloma	0.86
8	Stomach	3.1	Colorectum	2.2	Brain, CNS	0.86
9	Leukaemia	2.9	Leukaemia	2.1	Gallbladder	0.77
10	Corpus uteri	2.5	Gallbladder	2.0	Leukaemia	0.75
Males						
1	Lip, oral cavity	14.1	Lip, oral cavity	8.4	Liver	0.96
2	Lung	9.1	Lung	8.0	Oesophagus	0.95
3	Oesophagus	7.5	Oesophagus	7.1	Pancreas	0.94
4	Stomach	6.1	Stomach	5.5	Lung	0.92
5	Colorectum	6.0	Colorectum	3.7	Mesothelioma	0.90
6	Prostate	5.5	Liver	3.5	Stomach	0.89
7	Larynx	4.6	Leukaemia	2.9	Multiple myeloma	0.86
8	Leukaemia	4.0	Larynx	2.9	Brain, CNS	0.86
9	Liver	3.9	Prostate	2.7	Gallbladder	0.77
10	Hypopharynx	3.7	Brain, CNS	2.3	Nasopharynx	0.75

.ASIR, age-standardised incidence rate; ASMR, age-standardised mortality rate; CNS, central nervous system; MIR, mortality-to-incidence ratio; SA, South Asian; SAARC, South Asian Association for Regional Cooperation.

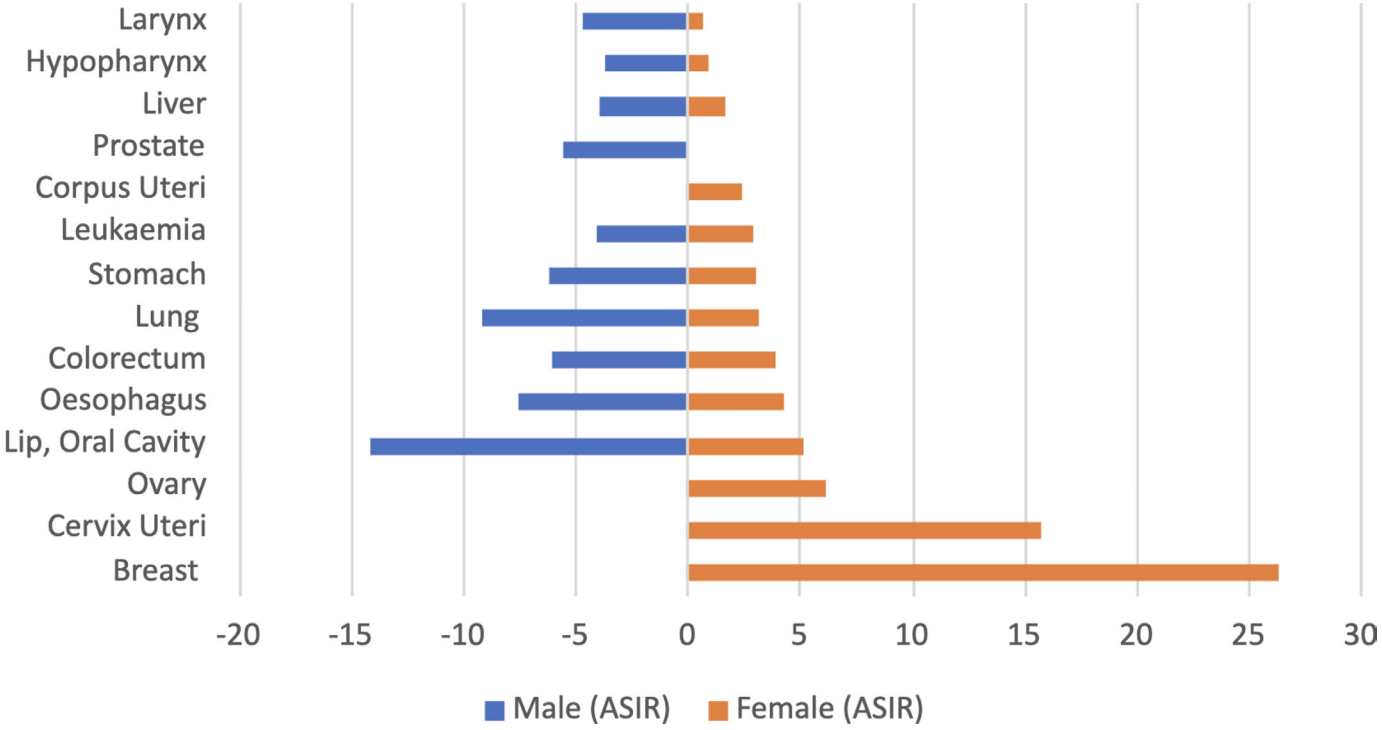

Figure 2 Sex differences in age-standardised incidence rate (ASIR) by cancer site.

data from the country on vaccination rates are available, and only 5% of women aged 30–49 were screened in the previous 5 years.[12]

Bhutan

For Bhutan, which had the second lowest ASIRs at 87.6, 80.6 and 82.9 for the overall population, females and males, its positive statistics may reflect the successful screening, HPV vaccination, and cancer prevention initiatives the Bhutanese government has supported. Over 90% of Bhutanese girls ages 12–18 receive the HPV vaccine and 70% of women aged 30–49 receive screening coverage, the Ministry of Health instituted the first national cytology-based screening programme in an LMIC in the year 2000, and the Ministry of Health partnered with the IARC to conduct studies on the success of these programmes.[12 13] Bhutan's vaccination, screening and research policy initiatives to prevent cervical cancer should serve as a model for other LMICs to implement. However, its MIR remains high at 0.75, 0.71, and 0.79 for the country, females, and males, respectively. Despite Bhutan already having instituted a national cancer registry and the Cancer Control Strategy,[14] its elevated MIR underscores the importance of not just improving access to screening and prevention measures, but also ensuring expedient and high-quality treatment options. Bhutan also lacks sufficient radiation oncologists and medical oncologists, leaving surgeons in various fields to serve at the forefront of managing patients with cancer.

India

While preventable, India has an extremely high cervical cancer burden, accounting for 132 000 new cases annually and more than one-fourth of overall cervical cancer deaths worldwide.[15 16] Contributors may include lack of funding for HPV vaccinations, stigma surrounding sexuality, differences in genital hygiene, low age at marriage, early age at first intercourse, and higher parity; these high rates of cervical cancer indicate the need for significantly better HPV vaccination, screening, and culturally appropriate sexual education campaigns across India.[17] Only 2% of women aged 30–49 received cervical cancer screening coverage in the previous 5 years, compared with the global target of 70% for the elimination of cervical cancer.[12] The male CIR may be driven by complex exposures such as smoking and other forms of tobacco use, infections associated with cancer, and, in certain populations, patterns of alcohol use. Beyond even the establishment of the National Cancer Registry Programme (Indian Council of Medical Research) and the National Cancer Control Programme,[18] the centrally sponsored scheme from India's Ministry of Health and Family Welfare, further screening and lifestyle education programmes are needed both at national and community levels to decrease cancer incidence and mortality in India, especially considering the country's vast cultural, socioeconomic and epidemiological diversity. Of note, from a research and treatment access standpoint, the National Cancer Grid, created in 2012, has helped to standardise cancer care in India and continues to support capacity building and clinical research in the country.[19 20]

Maldives

One of the most prevalent cancers in the Maldives, a country with relatively higher ASIRs of 105.3, 111.3, and

Table 3 2022 SAARC countries: cancer sites by country

Country															
Afghanistan		Bangladesh		Bhutan		India		Maldives		Nepal		Pakistan		Sri Lanka	
Cancer site	ASIR	Cancer site	ASIR	Cancer site	ASIR	Cancer site	ASIR	Cancer site	ASIR	Cancer site	ASIR	Cancer site	ASIR	Cancer site	ASIR
Breast	29.4	Oesophagus	16.0	Stomach	14.6	Breast	26.6	Breast	39.8	Breast	14.4	Breast	34.2	Breast	27.7
Stomach	11.0	Breast	15.2	Cervix uteri	13.3	Cervix uteri	17.7	Cervix uteri	22.6	Cervix uteri	14.2	Lip, oral cavity	9.2	Cervix uteri	9.2
Cervix uteri	10.3	Cervix uteri	11.3	Lung	6.5	Lip, oral cavity	9.9	Lung	12.4	Lung	9.3	Prostate	5.6	Ovary	8.2
Lung	7.2	Lip, oral cavity	10.3	Oesophagus	5.8	Ovary	6.6	Colorectum	11.8	Stomach	6.5	Lung	6.0	Lip, oral cavity	8.1
Prostate	6.5	Lung	8.8	Ovary	5.4	Lung	5.8	Prostate	10.5	Gallbladder	4.4	Ovary	5.0	Colorectum	7.8

ASIR, age-standardised incidence rate; SAARC, South Asian Association for Regional Cooperation.

107.1 for both sexes, females, and males, respectively, is cervical cancer among women. Indeed, Maldivian women have high rates of exposure to several risk factors of cervical cancer such as early age at childbirth and multiple pregnancies, yet only 6.2% of women reported having a pap smear and very few reported having knowledge of cervical cancer.[21–23] Local efforts are needed to implement strategies to educate and expand screening and vaccination for cervical cancer to reduce the significant burden among Maldivian women. Furthermore, the country has been suffering from a lack of a national cancer control plan, although the World Health Organization has helped their Ministry of Health launch this plan from 2022 to 2026.[24] Its national cancer registry remains in the early stages of development, presenting further obstacles to gathering critical cancer data.[25]

Nepal

Though Nepal has hospital-based cancer registries and is working on the implementation of a nationwide population-based cancer registry, the true magnitude of the disease remains under-reported, characterised by the lowest ASIRs of 72.8, 82.6, and 78.6 for the country, females, and males, respectively. Lung cancer is the most common cancer in Nepal, and more than two-thirds of the patients are diagnosed in advanced stages due to multiple factors like diagnostic delays, lack of healthcare access, and lack of screening programmes. Cervical cancer still remains the highest incidence cancer in women, probably due to poor screening programmes and lack of access to HPV vaccination.[12] With the gross domestic product per capita of Nepal being only US$729 and a quarter of the population living below the poverty line, the financial toxicity of cancer care is an especially significant barrier for most Nepalis to get the treatment they need. The federal government is taking steps to address this problem, including providing financial subsidies of US$1000 to families of cancer patients. The country has also now launched governmental health insurance programmes in every district; however, the coverage is poor and inadequate. Nepal also has a shortage of trained professionals to provide cancer care services and a growing gap between services in the private versus public sectors, leading to an increase in disparities in cancer treatment access and outcomes.[26]

Pakistan

Despite Pakistan's National Cancer Registry and National Cancer Control Programme, around 40% of the population is impoverished and 70% of patients are treated in public sector hospitals.[27–29] Indeed, this country suffers from large inequities in access to novel treatments and drugs for its population.[29] Worse, due to a lack of gas and electricity supply in large areas of Karachi and rural Pakistan, biomass use is extremely high.[30] Emissions from biomass combustion are classified as a group 2A carcinogen by the IARC and are associated with higher rates of lung and oral cancers.[31] Thus, these cancer risks may stem

more from environmental injustices that can be regulated, rather than behaviours. The two major cancer registries in the country are the Karachi Cancer Registry (KCR) and the Punjab Cancer Registry (PCR). These registries systematically collect data from various sources, including hospitals, pathology laboratories and death certificates.[32] They provide valuable information on cancer patterns, trends and geographical distribution, enabling researchers, policymakers and healthcare professionals to develop effective strategies for cancer prevention, early detection and treatment.[33] The data from these registries also contribute to research studies and facilitate international comparisons. Efforts are underway to establish and expand cancer registries in other regions of Pakistan to enhance the coverage and accuracy of cancer data in the country.[34] Pakistan is also in need of more comprehensive cervical cancer screening, vaccination and education programmes. Pakistan currently does not collect data on HPV vaccination rates and has a screening rate of 1% of women aged 30–49.[12]

Sri Lanka

While Sri Lanka's cancer incidence has doubled over the last 25 years, with it having the highest overall ASIR (106.9 for the country, 105.1 for females and 107.9 for males), the government has taken steps to address and prevent these cases.[35] Programmes for screening, prevention and treatment of cancers have been established and continue to expand, with the country's Ministry of Health already operating a National Cancer Control Programme and a National Cancer Registry.[36 37] Sri Lanka's cancer infrastructure is also particularly strong in that it offers completely free public healthcare to its citizens. However, there is still a lack of adequate radiotherapy facilities, local high-quality research in the region, and community-based palliative care facilities.[37]

Synthesis

While each country across the region faces unique challenges with regard to population, geography and resources, each of the SAARC countries is taking unique steps that should be shared and learnt across the other member nations. Bhutan, for example, should serve as a model for a robust cervical cancer prevention and screening programme with its high vaccination and screening rates contributing to it having the second-lowest ASIRs behind a likely under-reported Nepal. Nepal is especially commendable for its efforts to tackle the financial toxicity of cancer, providing a stimulus of US$1000 for families and patients affected by cancer. These policies may help in other countries across the SAARC at helping to combat issues such as treatment non-completion. India and Pakistan are notable for their efforts to support high-quality data and research with the National Cancer Grid and KCR/PCR, respectively. Furthermore, India has launched the Ayushman Bharat Yojana which provides free health coverage for low-income earners.

Although it may seem that the overall cancer incidence and prevalence are relatively lower in this region based on comparison against the world, SAARC region has higher MIR versus the world revealing inequities in cancer outcomes. Though the incidence may seem lower at first glance, the higher MIR reflects that SAARC countries are not very well prepared to address this cancer burden. Several barriers to oncological care, including shortages of specialised cancer providers, limited access to early screening and detection programmes, lack of availability of treatments and low treatment completion rates all prevent cancer patients from receiving the timely care they need in many SAARC regions.[26 38–40] Therefore, despite the lower overall incidence and mortality, the MIR remains high. Moreover, the rising cost of cancer care, paired with poor reimbursement from social safety nets like government-funded health insurance, renders treatment unaffordable for most of the SAARC population. As such, our findings support previous literature that has indicated the growing need for policy interventions to address financial toxicity in SAARC and other LMICs.[39–44]

Sex disparities in SAARC cancer incidence are likely due to the high incidence of breast (ASIR of 26.3) and cervical cancer (ASIR of 15.8). However, males in the region have higher overall MIRs than females (0.68 compared with 0.62). This may be a result of aetiological differences between sexes (such as rates of tobacco exposure, and therefore, lung and other tobacco-related cancers), reflecting similar trends worldwide, with female and male MIRs of 0.45 and 0.53, respectively.[45] Our findings are also consistent with other studies from the region and neighbouring areas. The higher MIR for males versus females in SAARC region is consistent with what has been previously described for the Arab population as well.[46 47] A similar trend was seen for ASMR, with males having higher rates than females overall (68.7 vs 63.5) as well as in each individual SAARC nation.

Furthermore, the most common forms of cancer among men were oral cavity and lip (ASIR=14.1), lung (ASIR=9.1), and oesophagus (ASIR=7.5). As these cancers are commonly associated with smoking, this trend supports previous studies that indicate a higher burden of smoking in SAARC among males.[48 49] Additionally, many SAARC men's lifestyles include smoking excess amounts of bidis (unfiltered tobacco leaves), chewing paan (betel nut leaves), and sucking areca (a South Asian nut). This has been shown to substantially increase the risks of oral cavity and lip cancers, which are extremely prevalent in SAARC.[50] Policy-level initiatives that introduce programmes for widespread screening[51] and innovative educational campaigns on the harmful effects of smoking and chewing paan and areca may therefore be beneficial in this region. Although smoking cessation interventions and antismoking laws have been launched, they have been uncoordinated and not very successful in reducing the prevalence of tobacco consumption.[52] Similarly, effective implementation of cervical cancer screening and HPV vaccination can substantially reduce

the burden of cervical cancer in the region. These represent low-hanging fruits for effective cancer control in the SAARC region, aligned with the philosophy of the cancer groundshot.[53 54]

Although the SAARC region constitutes a substantial proportion of the world population and global cancer population, concerted efforts to address oncology research and care in this region are lacking. Given the otherwise similarity in health systems, it is important to launch a concerted effort across the countries rather than reinvent the wheel in each individual country. That will require substantial and meaningful efforts from organisations such as the SAARC Federation of Oncology that can unite cancer prevention and treatment efforts across the region, promote research, and advocate for the international cancer community on behalf of the SAARC population.

Of note, our study provides novel insights into the epidemiology of cancer across SAARC; prior studies using GCO data to understand cancer burden in SAARC are either outdated or did not cover all countries[55] or are limited to specific cancers (such as cervical).[56] More recent studies using the GCO dataset to investigate the cancer burden in SAARC have been broader, with SAARC being a small part of a more global study.[2] Our study specifically investigates the SAARC region which has unique cultural, racial and ethnic traditions that contribute to its distinct cancer profile.

Limitations of this study stem from the limitations of the GCO dataset. As described in the Methods section, the data for many of the included countries were imputed based on other data sets due to the unavailability of reliable data from cancer registries in the individual countries. This represents the biggest limitation of our study; however, in the absence of other reliable sources of data, this remains the best of what is knowable in the region. Moreover, the population-based cancer registry may suffer from underreporting and miscoding combined with low screening rates, such that these data may underestimate the 'true' burden of cancer. We hope that better quality population-based cancer registry data are available from SAARC countries in the future so that such imputations are not necessary. In fact, this represents the lowest hanging fruit for a better cancer policy in the SAARC region. Effective policy is data-driven policy, and in the absence of reliable population-based cancer registries, accurate data on cancer burden would be difficult to derive, and epidemiological trends would be even more difficult to analyse. Thus, developing a population-based cancer registry should be among the topmost priorities for SAARC nations.

Other limitations include the retrospective nature of the data inherent to large database studies, as well as limitations inherent to the cancer indices that are used. For example, MIR is a relatively cruder measure as opposed to survival rates, but it is a simpler measure that is easier to calculate with just the incidence and mortality data which are more readily available. Additionally, as the data comes from the year 2022, the impact of COVID-19 pandemic on cancer epidemiology may not have been fully captured yet.[57] In addition, although representing relatively less heterogeneous population, SAARC does represent eight different countries with different healthcare systems and differing demographics, and therefore, individual attention should be paid to country-specific differences, while working together for a collaborative SAARC-wide policy action. For example, previous studies have highlighted that cancers like colon and prostate can be considered rare in countries like Bhutan and Nepal, but not in Sri Lanka.[58] However, reliable estimates from population based cancer registry are needed to understand whether the rare cancers are indeed rare or simply under-reported. Furthermore, SAARC countries also have within-nation diversity, such that national-level estimates likely do not account for heterogeneity in geography, socioeconomic factors and ethnocultural groups, underscoring the need for future work with perspectives from local practitioners that provide further nuance to our understanding of cancer epidemiology in the region.[59 60]

The methods the GCO uses to estimate these indicators vary by country in the SAARC region. For Afghanistan, no data on cancer rates (incidence and mortality) are available, so the mean of Pakistan, Tajikistan and Uzbekistan rates are applied to the 2022 national population. For Bangladesh, data on cancer rates are similarly unavailable, so the mean of the rates from the Indian states of Meghalaya (2010–2016) and Tripura (2010–2016) and the district of Cachar (2010–2016) is applied to the 2022 national population. For Bhutan, data on cancer rates are similarly unavailable, so the mean of the rates from India from Kamrup Urban District (2007–2016), Dibrugarh District (2007–2016), Sikkim State (2007–2016) and Mizoram State (2007–2016) is applied to the 2022 population. For India, the national cancer rates are computed using population-weighted averages of rates from local, population-based cancer registries (2010–2016) projected to 2022. For the Maldives, no data on cancer rates are available so Indonesian rates are applied to the 2022 population. For Nepal, no data on cancer rates are available so the mean of the rates from the Sikkim State (2013–2016), Pasighat (2013–2016), Kamrup Urban District (2013–2016) and Dibrugarh District (2013–2016) in India were applied to the 2022 population. For Pakistan, cancer rates from Punjab (2008–2017) projected to 2022 are applied to the 2022 population. Finally, for Sri Lanka, cancer rates from Colombo district (2013–2017) are applied to the 2022 population. For every country in the SAARC region, cancer mortality was estimated from incidence using MIRs derived from survival estimation.

CONCLUSION

Using the data from GCO, our study highlights the distinctive cancer landscape of the SAARC region with a low CIR and CMR and an elevated MIR compared with global figures, reflecting inequities in cancer outcomes.

Given the region's considerable population and unique sociocultural context, a united, contextually relevant approach is imperative for tackling its cancer burden. We urge policy-makers to prioritise investing in collaborative, tailored cancer care programmes that span prevention, treatment, palliative care and research capacity building to strengthen the SAARC region's healthcare infrastructure against the growing cancer challenge.

Author affiliations
[1]School of Medicine, University of Pittsburgh, Pittsburgh, Pennsylvania, USA
[2]Global Health Institute, Duke University, Durham, North Carolina, USA
[3]School of Medicine, Stanford University, Stanford, California, USA
[4]Department of Brain and Cognitive Sciences, Massachusetts Institute of Technology, Cambridge, Massachusetts, USA
[5]Department of Health Promotion and Disease Prevention, University of Southern California, Los Angeles, California, USA
[6]Department of Cell Biology, University of Pittsburgh, Pittsburgh, Pennsylvania, USA
[7]Georgetown University Medical Center, Washington, DC, USA
[8]Department of Biology, Harvard University, Cambridge, Massachusetts, USA
[9]Department of ENT and Head Neck Surgery, Jigme Dorji Wangchuk National Referral Hospital, Thimphu, Bhutan
[10]Department of Healthcare Management & Policy, University of Pennsylvania, Philadelphia, Pennsylvania, USA
[11]Department of Oncology, Balco Medical Centre, Naya Raipur, Chhattisgarh, India
[12]Department of Business Technology and Service Delivery, Highmark Health, Pittsburgh, Pennsylvania, USA
[13]Department of Health Services Administration, Indiana University of Pennsylvania, Indiana, Pennsylvania, USA
[14]Department of Oncology, BINOR Cancer Hospital Bannu, Alamdar, Pakistan
[15]Department of Pediatric and Clinical Oncology, National Cancer Institute Sri Lanka, Maharagama, Sri Lanka
[16]Department of Pediatric Oncology, Lanka Cancer Research Group, Maharagama, Sri Lanka
[17]Department of Oncology, National Academy of Medical Sciences, Bir Hospital, Kathmandu, Nepal
[18]Department of Clinical Oncology, Jamhuriyat Hospital, Kabul, Afghanistan
[19]Department of Oncology, Evercare Hospital, Dhaka, Bangladesh
[20]Harvard T.H. Chan School of Public Health, Boston, Massachusetts, USA
[21]Department of Internal Medicine, Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania, USA
[22]Department of Radiation Oncology, Memorial Sloan Kettering Cancer Center, New York, New York, USA
[23]Department of Oncology and Department of Public Health Sciences, Queen's University Cancer Research Institute, Kingston, Ontario, Canada

X Bhav Jain @BhavJain_, Sanjeeva Gunasekera @Gunti777 and Edward Christopher Dee @EChrisDee

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ORCID iDs
Urvish Jain http://orcid.org/0000-0002-0012-1991
Bhav Jain http://orcid.org/0000-0003-2648-4894
Tej A Patel http://orcid.org/0000-0002-0882-2960
Bhawna Sirohi http://orcid.org/0000-0001-8093-1531

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