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National Cancer Control Plans: Comparative Analysis between South Africa and Brazil Focusing on Colorectal Cancer Control

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Abstract

Background: According to WHO, National Health policies should define people-centred care and address the social determinants of health. Similarly, reliable information systems are critical for decision-making and informing public health strategies. The objective of comparative study was to compare South Africa and Brazil's colorectal cancer (CRC) control policy frameworks focusing on CRC epidemiology, risk factors, screening, and measures for early detection and control and surveillance approaches in each country. These countries are in the upper middle income category as defined by the World Bank, have similar patterns of cancer burden, health system infrastructure. And are part of the economic cooperation with China, Russia and India called BRICS.

Methods: A literature search targeted WHO website, GLOBOCAN, PubMed and Medline sources to identify CRC guidelines for South Africa and Brazil published from year 2000 to year 2020. Data was extracted to a table by policy key components for comparison.

Results: Both country cancer plans were informed by epidemiology and aligned to the WHO guidelines and STEPS surveillance mechanism. The national cancer registry was last published in 2014 for South Africa and in 2018 for Brazil. Both country policies cover the full spectrum of prevention, early detection, diagnosis, treatment and palliative care. CRC screening plan did not exist in South Africa. Operational plans on risk factors with annual targets existed in both countries. Inequity of CRC services at regional level and between public and private sectors affected both countries.

Conclusion: South Africa and Brazil address the cancer risk factors proactively. Gaps remain to ensure equity of colorectal cancer services in each country. Partnership opportunities exist to facilitate population based survey in South Africa, support equity of cancer services in both countries given the CRC projections. The partnership is the catalyst to advance harmonised and optimised CRC control programme through innovation in both countries.

Keywords: Cancer control plan; Colorectal cancer; South Africa, Brazil

Key messages

- Effective cancer control planning guide policy-makers and programme managers in decision-making concerning appropriate interventions and investments towards improving cancer outcomes.
- Monitoring National Cancer Control Plans (NCCPs) implementation can track improvements towards achievement of non-communicable diseases (NCDs) Global Action Plan targets by 2025 and the Sustainable Development Goals (SDGs) by 2030.
- As countries move towards Universal Health Coverage (UHC) close monitoring of NCCPs implementation within the context of UHC becomes critical in terms of health systems strengthening
- The review findings can be used to advocate for gaps in NCCPs needing attention in the planning and implementation cycles of National Cancer Control Programmes and NCDs in South Africa and Brazil

Introduction

Background-overview of colorectal cancer

Cancer is among the top five causes of morbidity and mortality worldwide. This is supported by the GLOBOCAN 2018 report that estimates 18.1 million new cases of cancer and 9.6 million deaths from cancer in that year. The report, states that there were over 1.8 million new colorectal cancer cases and 881,000 deaths in 2018 [1].

Colorectal cancer ranks third in terms of cancer incidence and ranks second in terms of cancer mortality. This translates to about 1 in 10 cancer cases and deaths globally. It is considered as a marker of socioeconomic development with the rising of incidence rates in tandem with increasing Human development index (HDI) [2]. By 2030, the projected global burden of CRC is expected to reach more than 2.2 million new cases and 1.1 million deaths [3].

The 2018 Global Cancer Report, on CRC incidence by world regions, reports a high CRC burden in high income and developed countries and a gradually increasing burden in developing countries including the Southern Africa region. This region rank 12th among the United Nations (UN) regions on CRC burden.

Colorectal cancer epidemiology in South Africa and Brazil

South Africa

Colorectal cancer is 5th most frequent cancer in South Africa. The incidence rate of new colorectal cancer (CRC) in South Africa reported

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in 2018, was 6,937 (6.5% of all cancer cases) and mortality rate was at 6.4% of all cancer cases. Of these, 3 508 (7.3% of all cancer cases) are males and 3 429 (5.7% of all cancer cases) are females. The Global Cancer Observatory (2018), stated that colorectal cancer incidence rate, in South Africa, is 14.4 per 100,000 population. The gender differentiation shows that the incidence rate is 7.3 and 7.1 per 100,000 for males and females respectively. There is also an increase in CRC mortality from 795 cases in 2010 to 931 cases in 2015, showing a 17% increase between the six year period. And the CRC new cases in females have increased by 6% between 2014 and 2018 in South Africa The estimated number of new cases will increase by 39% in South Africa and estimated number of deaths will increase by 40% (2 498 per 100,000) in 2018 and 3 495 in 2030. South Africa has higher CRC age standardised (world) incidence rate (ASIR) estimates when compared to the Southern African United Nation's regional ASR. (14.4 versus 13.4 per 100 000).

There were 133,675 premature deaths as a result to non-communicable diseases (NCDs) in 2016, and of these 23.3% were due to cancer. The projected costs of delivering an essential service package and scaling-up coverage will be USD 8 per capita per year with almost 14,000 projected lives saved per year by 2030.

Brazil

Colorectal cancer is 4th most frequent cancer in Brazil. The incidence rate of new colorectal cancer (CRC) in South Africa reported in 2018 was at 9.3% and mortality rate was at 10.1% per 100,000 population. There is 25% increase in mortality among males with colorectal cancer in Brazil, from 3 993 in 2010 to 4 995 in 2015 in absolute numbers. The CRC new cases among females have increased by 10% in Brazil between 2014 and 2018. The CRC mortality ranked fourth among cancer related deaths in Brazil. The CRC age-standardised mortality rate in 2015 was 1.2 times higher among Brazilian males compared to females (4.91 and 3.96 per 100,000 population, respectively).

Brazil's CRC ASIR is higher than the South American regional ASR estimates (19.6 versus 18. 6 per 100,000) as reported by GLOBOCAN 2018 report [1]. There were 416,222 premature deaths as a result to NCDs in 2016, and of these 30.3% were due to cancer in Brazil. The projected costs of delivering an essential service package and scaling-up CRC coverage will be USD 8 per capita per year with almost 45,000 projected lives saved per year by 2030.

Research questions

Q1: What are similarities and differences between the colorectal cancer national policies for South Africa and Brazil noting the CRC burden in both countries?

Q2: What are key lessons and best practices that can be learned by policy makers and programme managers from both countries that can be shared between the two countries, through current economic partnership?

Why compare between South Africa and Brazil?

Both countries have high burden of communicable diseases and there has been a growing investment towards reducing these. However, at the same time, non-communicable diseases are also on the rise as both countries enjoy democracy and there is high adoption of western lifestyles that further increased the risk factor for NCDs [3,4].

There are also major health reforms underway, including universal health coverage; therefore, it is important to better understand how NCCPs development and implementation are being influenced by all these factors. Furthermore, both countries are rated as middle income countries based on the World Bank and have undergone economic development and transformation in the recent past. As part of BRICS, they have a unique political and economic south-to-south partnership along with Russia, China and India and are called by the acronym the "BRICS". The BRICS partnership is commended to be a new voice of influence in global health arena. It is perceived to offer new approaches of partnership guided by principles of mutual coordination, cooperation and collective action for solutions addressing global health challenges. Nonetheless BRICS also accounts for over 40% of the global burden of disease, hence, as this partnership gains global recognition, it is important to assess how some of the BRICS member states, in this case South Africa and Brazil, develop their health policies, in response to disease burden, especially, in areas where there has not been any publications of collaboration and cooperation [5-7].

South Africa and Brazil have a mixed public and private health systems. Although in South Africa, the systems operate independently, there is a move, since 2015 towards the universal health coverage (UHC), while Brazil, these systems have now been unified. Both countries have three levels of health care service provision, namely, national (federal), provincial (state), and district (municipal) supported by equitable share financial system. In both countries, primary health care (PHC) remains the first level of health care providing comprehensive prevention, acute and chronic free services, located at district/municipal level to easy access by all country citizens [8].

Why policy and guidelines on CRC control are important?

To fight cancer, in 2017, the World Health Assembly, urged member states to develop and implement cancer control plans to guide all prevention and management activities to reduce cancer burden. This call supported a resolution against the rising number of non-communicable diseases (NCD) reported in 2011 by the United Nations. Globally, it is noted that the national cancer plans are crucial to effectively address the cancer burden and NCDs by prioritising cancers through coordinated programmes [9].

As such, South Africa (SA) RSA and Brazil (BR) endorsed the resolutions and developed plans and guidelines addressing risk factors for NCD, and controlling cancer. National cancer control plans (NCCPs) guide strategic priorities in cancer care and plan for the appropriate allocation of resources based on the socio-economic and geographic needs of a population [10].

WHO recommended that effective cancer control plans should be comprehensive and integrated. It must be based on evidence to reduce new cases, deaths and sickness and improve the quality of life of cancer patients. The plan should include interventions addressing prevention, early detection, diagnosis, treatment and palliative care [11]. WHO further advocated that the plans should promote human rights, multi-sectoral collaboration, multi-stakeholder involvement, capacity building, equity, cost-effectiveness, and affordability, targets in terms of gender, age, ethnicity and sustainability through integration with NCD-plans. WHO suggested the process for plan development to consider input, process, output and outcomes as depicted by **Figure 1**, below.

Rationale for the study

Although a few studies have been conducted to analyse NCCPs in developing countries there is limited collection of baseline data to monitor progress in development and assess impact of the NCCPs over time. When developed and implemented effectively, NCCPs improve cancer outcomes at the population level [12].

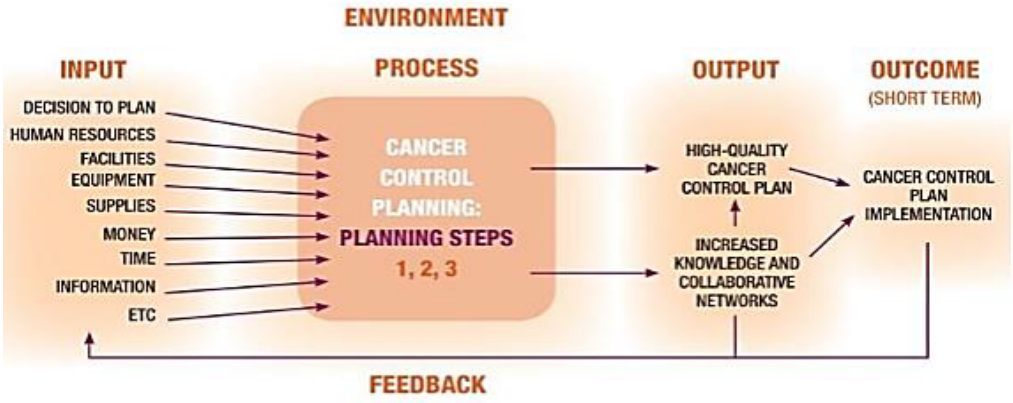

Figure 1: Components of the Cancer Control Planning process.

Source: Components of the Cancer control planning process. Source: WHO, 2006 [accessed 11th April 2020].

Purpose

To assess inclusion of key domains characterising an effective cancer control plan for CRC as one of the types of cancer and, identify strengths and limitations of existing plans. Data from the review can be used by stakeholders in South Africa and Brazil to advocate for and highlight missed opportunities for partnership for effective, well-resourced and closely monitored NCCPs.

Aim

To assess, and compare the South African national cancer control plan with the Brazilian control plan, using directed-content analysis, to identify key domains included and potential lessons and best practices that could be shared between the two countries that have economic cooperation under BRICS.

Objectives

1. Determine the current cancer control plans that include colorectal cancer control interventions in both countries.
2. Identify inclusion of interventions to address risk factors, expand service coverage, explicitly state the target groups, describes investigations and treatment interventions informed by evidence.
3. Assess the extent of integration with NCD management and the priority types of cancers included in each plan.
4. Assess the extent to which the cancer control plans are aligned to WHO framework including principles, benefits and gaps.
5. Review and compare the capacity of each country's guidelines and services that attempt to address risk factors.
6. Assess the monitoring and surveillance plan in terms of coverage, data sources, frequency of monitoring, annual target setting and overall data information systems.

Intended Use and Significance

The findings of policy analysis are intended to support the implementation of the South Africa and Brazil National Strategic Cancer Control Plans, particularly for CRC, to inform planning and resource allocation for effective services delivery within the integrated service platform to reduce the incidence and mortality of CRC.

This study will highlight benefits and gaps on current national cancer control policy and guidelines in South Africa and Brazil in need for support and capacity strengthening. In addition, it will identify opportunities for collaboration to share best practices and motivate for specialised capacity building initiatives and twining partnerships between the two countries.

Methods

The literature search targeted WHO website, Health Ministry websites, and GLOBOCAN, PubMed and Medline sources. The criteria included national cancer control plans and colorectal cancer (CRC) guidelines documents published from for South Africa and Brazil from year 2000 to year 2020. In addition, plans addressing management of non-communicable diseases in each country were also included. The Cancer Country Profiles were also included.

In this study, we used the data captured on the status of cancer control and inclusion of key domains for effective plans as well as inclusion of colorectal cancer in the policy in terms of diagnostics and services delivery at primary, secondary and tertiary health care levels.

The documents were grouped by country of origin, by disease (cancer in general, colorectal cancer and non-communicable diseases) and by year. The documents were reviewed by the principal investigator on the data review and extractions guidelines for each country and presented as a table to enhance comparison [13].

Through the critical document analysis and synthesis we developed an analysis framework, tested in this study, which characterized policy or plans in different categories:

(1) Cancer Control Plan Components: including guiding principles of the cancer control plan).

(2) Benefits and gaps identified: including accessibility and comprehensiveness of services.

(3) Country has guidelines and services addressing risk factors: including tobacco and alcohol use, diet and physical activity.

(4) Colorectal cancer investigation for diagnosis: including laboratory and pathology and physical exam.

(5) Colorectal cancer treatment: including surgery, chemotherapy, and radiotherapy.

(6) Monitoring and Surveillance: including reduction targets, data from national registry and alignment with WHO Stepwise approach to surveillance (STEPS) mechanism.

The sample frame was used to select a purposive sample of documents published during the stated time period. This approach sought to achieve: (1) diversity and broad range of documents related to cancer control and NCD; and (2) reviewing documents to identify insights (e.g. principles and values, policy components, stakeholders involved). This also allowed breadth of analysis to ensure exhaustive document review.

Ethical approval and consent of the study was provided by the Medical Ethical Review Committee of the University of Antwerp in April 2020 [No. EC 20/11/127].

Results

Table 1 presents the status of cancer control policies, availability of guidelines, screening and early detection and treatment service delivery availability in multiple health care levels in the public and private sectors in South Africa and Brazil.

The comparisons focused on the following components:

1. Extent of integration with NCD management. Highlights priority types of cancers and includes colorectal cancer control based on epidemiology.

Table 1: Colorectal Cancer mortality and survival in South Africa and Brazil 2018.

1. Cancer Control Plan (NCCP) Components	SOUTH AFRICA	BRAZIL
Type of Plan	NCCP + NCD	NCCP + NCD
Has an operational cancer policy/strategy/action plan on cancer control	Yes	Yes
Has national guidelines for NCD management	Yes	Yes
Had a specific national guideline for colorectal cancer control	No integrated with NCCP	Yes
Priority cancers included in detail in the plan based on epidemiology	Yes	Yes
Highest burden cancers highlighted	Yes	Yes
Identification of the priority needs of the country based on evidence and addresses majority of WHO cancer control plan principles	Yes	Yes
Cancer control actions available to reach all members of the population. Focus on vulnerable populations (indigenous)	not equitable Yes	not equitable Yes
Cancer control plan spectrum-comprehensive full spectrum of prevention, early detection, diagnosis, treatment and palliative care	Yes	Yes
Colorectal national screening programme and campaigns	No	Yes
2. Principles of Equity and Coverage		
Access to cancer diagnostic and therapeutic services	Services (in both public and private)	Services (in both public and private)
Geographical location of the services	Booking systems used to access public and private health diagnostic and therapeutic services Current evolution towards Universal Health Coverage	Booking systems used to access public and private health diagnostic and therapeutic services Universal Health coverage in place
	Concentration of services in 3 of the 9 provinces. Services are clustered in metropolitan cities-Johannesburg, Cape Town and Durban.	Concentration of services in only 3 of the X regions in the country where CRC burden is highest
3. Country has guidelines and services addressing risk factors		
Has an operational policy, strategy or action plan for **reducing tobacco use** includes smoke-free legislation **and tobacco warning signs**	Yes	Yes
Tobacco tax implemented and Pricing policy for tobacco and alcohol Restrictive legislation-advertising tobacco and alcohol	Yes Yes Yes	Yes Yes Yes
Has an operational policy, strategy or action plan for **reducing overweight/ obesity**	Yes	Yes
Has an operational policy, strategy or action plan to **reduce physical inactivity** and/or promote physical activity	Yes	Yes
Has an operational policy, strategy or action plan to **reduce the harmful use of alcohol** **e.g.** Better inform consumers by improving the labelling of alcoholic beverages to include prominent warning labels and nutritional information;	Yes	Yes
4. Colorectal cancer investigation for diagnosis		
Early detection programme/ guidelines for Colorectal cancer prevention	No	Yes
Faecal occult blood test or faecal immunological test	Yes	Yes
Bowel cancer screening by **colonoscopy**	Yes only high risk patients	Yes only high risk patients
Pathology services	Yes	Yes

Investigations to different **target groups** : • Asymptomatic • Symptomatic • High risk	No Yes Yes	No Yes Yes
5. Colorectal cancer care continuum		
Public cancer centres per 10,000 cancer patients	1.2	6
Has **comprehensive care centres**	Yes but mostly at tertiary level in 3 major cities	Yes but mostly at tertiary level in 3 regions with high burden
Treatment including **surgery**	Yes in public and private health systems	Yes in public and private health systems
Existence of **radiotherapy centres**	Yes in public and private health systems but at tertiary level	Yes in public health systems but at tertiary level
Chemotherapy (medicines not specified)	Yes in public and private health systems	Yes in public and private health systems
Oral morphine (formulation not specified)	Yes in public and private health systems and non-profit-cancer organisations e.g. Cancer associations	Yes in public health systems and non-profit-cancer organisations e.g. Cancer associations
Palliative and survivor care:		
Community/home care for people with advanced stage cancer and other NCDs	Limited availability through cancer non-profit organisations	Yes as part of public health system
Key principles for quality are considered Safe, effective, timely, patient-centeredness	Yes	Yes
6. Monitoring, Research and Surveillance		
National **Cancer register**	Yes	Yes
Reported Quality of the national cancer registry data as stated by the Cancer Country Profile 2020	High	High
Reported Quality of mortality registry data as stated by the Cancer Country Profile 2020	Medium	High
Scope	Population and Pathology-based reliability and completeness of data reported from these registries are variable	Population based newly established with strong technical support from the regional cancer hub
Coverage	Restricted to only 3 cities in 3 provinces with tertiary hospitals	Expanded to sub-national level mainly in southern regions with highest burden on CRC
Last year of CRC **data publication** from cancer registry	2019	2019
Targets included to reduce risk factors for NCD including cancers	None	None
Targets to reduce risk factors on NCD	Yes	Yes
Aligned to or adopt WHO guidelines and **STEPS surveillance mechanism**	Yes	Yes
7. Governance		
Mechanisms to implement and monitor a plan Different levels of health care	Yes	Yes
8. Finance		
Allocation of funding for CRC prevention and care	Part of NCDs	Part of NCDs
9. Health Workforce		
Expanding, **training**, strengthening, and qualifying oncologic care within the regions as part of the NCCP/NCDs	Yes	Yes

2. Ensures Equity and wide coverage.
3. Address risk factors.
4. Outlines types of investigations for diagnosis.
5. Care continuum (from prevention to palliative care) informed by evidence.
6. Monitoring, Evaluation, Research and surveillance.
7. Governance mechanisms.
8. Funding sources for implementation of the NCCP.
9. Health Workforce to support the implementation of NCCP.

Results and Discussion

The document review shows that both countries have developed comprehensive cancer control and non-communicable (NCD) plans that are currently operational. Both plans were developed through wide consultation with relevant stakeholders. These NCPPs are linked but not integrated to NCD guidelines and other policies, showing that there is comprehensive integration of health systems response to address the determinants of health. Both countries have NCD plans and time-frames are not aligned with NCCPs, as the NCDs were developed earlier and are revised after 5 years.

Both NCCPs advocate for reduction of modifiable risk factors for cancer such as smoking, obesity, lack of physical activity, unhealthy diet, alcohol consumption, and occupational and environmental exposures. Espina stated that more than 40% of all cancer cases are preventable [14]. The International Agency for Research on Cancer-IARC 2015 and World Cancer Research Forum-WCRF reports estimated that people that follow healthy lifestyles have18% lower risk of developing cancer [15]. This review shows that both South Africa and Brazil have shown their commitments through development and implementation of legislative and regulatory measures supporting the reduction of risk factors for NCDs although they vary in terms of investments and financing for NCD for sustainability.

Both NCD plans include hard targets, as recommended by the Global Action Plan on NCDs with time frames to reduce these risk factors through targeted population interventions as outlined by NCD guidelines, and recommended by [16-18]. In addition, the plans provide detailed activities for tobacco control policies, including tobacco taxation and control of tobacco advertisement and promotion. Similarly, there are alcohol consumption restrictions in place to reduce harmful use of alcohol in both countries. Hence, control of these risk factors seeks not only to reduce NCDs but also cancer burden in both countries [16,19]. Furthermore, WHO global strategy promotes healthy diet and physical activity to prevent overweight and obesity, and cancers such as colorectal and breast cancers [19,20]. Both countries have health promotion campaigns that promote healthy lifestyles using mass media. In addition, it is integrated into life skills curriculum at schools and into clinical assessment and management in health care settings in all levels. There are also standardised interventions suggested to address physical inactivity and poor diet practices that are roll-out to communities through community health workers as part of the community based primary health care outreach programmes in both countries.

The review also highlights alignment of countries' NCCPs with the WHO recommended key domains for effective plan development. The plans also include quality of care dimensions including safety, patient-centeredness, timeliness and effectiveness as described in the research [21]. Furthermore, the plans are inclusive of all age groups and the national responses to non-communicable diseases, in line with the 2030 Agenda for Sustainable Development [9].

In terms of diagnostics for CRC, competencies and capacity are critical for any early detection programme as this influence survivorship, advocating for efficient and effective screening. The review identifies differences in that the Brazilian NCCP covers CRC in detail while the South African NCCP excludes CRC but focuses on the top 3 types of cancer (lung, cervix and breast) for now, stating other types of cancer will be considered in the next phase of the Cancer Control Framework [22]. This is in line with the WHO recommendations, for low-resource settings, that the first phases of national frameworks development can promote early diagnosis of one or two priority cancers. However, it also promotes early detection through community awareness approaches [20].

Both NCCPs and NCD documents outline the current screening approaches implemented in both public and private sectors for individuals at high risk of cancer i.e. those with familial/hereditary, or suspect upon screening. The South African documents support the colonoscopy as a standard screening procedure for CRC, for people at substantial high risk that is with family history of the disease, with previous CRC or adenomatous polyp and with history of inflammatory bowel syndrome. In South Africa, there are two screening procedures that are promoted, one being the faecal occult blood (FOBT) which is non-invasive, cheap and easy to perform and does not require sedation. This method is likely to be more acceptable to patients although there is no current evidence to confirm this notion in South Africa. The second one is the endoscopic screening that can either be colonoscopy or flexible sigmoidoscopy, requires an expert provider to perform, sedation and bowel preparation. This method is also perceived to be superior, however, is reported to have low compliance, with reasons not fully documented or reported [23].

Most recent CRC cost study, reported that patients that access private care are diagnosed at the early stage than those that go to the public sector cohort (35% vs. 63%) [24]. Noting that CRC incidence in South Africa mostly affects Caucacian and Africans, it will be important to prioritise access to screening among these two groups [25,26] particularly in the public sector as most Africans utilise services in this sector. In addition, McCabe (2019) study found at diagnosis African patients had median age of 56 years as compared to 62 years among caucacians.

Similarly, in Brazil, the Brazilian Society of Coloproctology and the National Cancer Institute recommended that people should be screened annually from the age of 50 years in low-risk individuals, using faecal occult blood screening) and sigmoidoscopy every five years. Colonoscopy or barium enema is only indicated every ten years among people 60 years and older.

Colonoscopy has been considered as the current gold standard for CRC [9,27] and is adopted by both countries. In South Africa and Brazil, CRC screening advantages and disadvantages are clearly explained to ensure that clients make informed decisions of the tests preferred, although the guidelines from both countries recommend colonoscopy for people at high risk. However, the research reported that the FOBT was used most frequently by physicians and nurses in Brazil [28]. Using the FOBT in Brazil showed a high compliance and high detection rates [29].

The studies have shown a 21% cumulative reduction in CRC mortality through using the screening approaches targeted at average-risk individuals. As in South Africa, priority groups, particularly of patients of African descent should be prioritise for screening, as supported by findings from the retrospective observational cohort study among 1,002 patients with CRC admitted from 2000 to 2014 at Barretos Cancer Hospital, Brazil. The study reported that patients with African ancestry developed CRC at a younger age matching results from South Africa and American studies. Furthermore, CRC incidence are higher in South, South east and Midwestern regions, hence, there is cost benefit in targeting these regions [30].

Through screening, the benefits from early detection of CRC outweigh the costs of screening and significantly reduce CRC related mortality cases [31]. The study on knowledge, attitude and practices reported that nurses were more likely to conduct CRC screening than physicians (65% vs. 47%) [28].

However, globally, there are concerns expressed through the literature that CRC screening continues to be only offered to a small proportion of the target population in a vast majority of countries with exception of Europe and North America [32]. The differences in CRC screening strategies are influenced by CRC incidence, economic resources, healthcare structure and infrastructure to support screening [33] in different countries around the world. Hence, demand creation of and mentorship on CRC screening among health professionals as well as equity in accessing screening cannot be overemphasised.

A mathematical modelling study showed that in the sub-Saharan African region, as defined by WHO, screening for CRC by colonoscopy at age 50 years in combination with treatment not only increases survival but also can be cost-effective [34,35]. However, there is now new evidence that other screening methods, such as FIT when combined with CRC risk factors in predictive models, has shown to have acceptable discriminative power confirming that it may be necessary to consider faecal tests as it is also cost effective [36].

In terms of monitoring the CRC burden within each country, the population based national cancer registries have been recently developed in South Africa and Brazil reflecting high quality data. However, in

South Africa, the mortality register has been reported to have medium quality data [25]. Regardless, both countries have information systems aligned to WHO guidelines and STEPS surveillance mechanisms.

Both plans have mechanisms to implement and monitor implementation at different levels of health care. In terms of training both countries NCCPs promote expansion of training, capacity strengthening, and advocate for establishment of qualifying oncologic care in all regions. This is also promoted in NCD related documents. Health system strengthening, including human resources for health, based on the WHO building blocks is critical especially the primary health care, for early detection of suspected cancer cases and referral for further investigations and management [37].

Both countries have the requisite technical expertise, research capacity, and data management systems to adequately address NCD challenges, however, they may need additional resources for service delivery, training, implementation research, and capacity building initiatives for cancer control and management, as a component to achieve Universal Health Coverage (UHC).

Areas of continued unmet need from the NCCP review include allocation of appropriate budgets relative to other health problems, cost-effective screening approaches for mass screening, monitoring and evaluation of plan implementation, and strengthening of information systems. The major weakness observed in NCCPs from both countries, is that both are unbalanced in terms of regional coverage of interventions [38,39].

Hence, if left not attended as part of UHC, inequities might increase in terms of access to healthcare amongst individuals who have different socio-economical levels [40]. To determine if the BRICS member states relative health performance have matched with economic performance, the study compared the reductions in age- and sex-specific mortality seen in each BRICS country between 1990 and 2011. The authors concluded that China and Brazil were the top two best performers and South Africa and the Russia had remarkable declines in health performance, particularly, large sex-specific inequalities in health [41]. Another study also shows that on average the patients that access CRC screening and care in public health sector are younger than those that access the private health care (57 years vs. 63 years) [24]. In addition, the study reported inequities in chemotherapy access between public and private health sector, with private sector providing more regimens than the public sector in South Africa [42].

Lesson to be considered is that what is not measured is not funded and not monitored. With less attention to social inequities in health, there might be increasing unmet needs, which further impact negatively on the determinants of health [43]. There is published evidence that low income, lack of health insurance and high levels of co-payment are associated with lack of adherence to oral anti-cancer drugs, affecting survival of cancer patients [44-49]. This is a major concern considering that by 2030, Africa will have an 85% increase in cancer burden [3,50-54].

Limitations

Firstly, only published documents published in English or have an English abstract were considered in the selected search engines as mentioned above. Hence, this limits comprehensiveness of documents identified from each country and might have revealed different results should other search engines were included. Secondly, the focus of review as on documents published by the Ministry of Health in each country or papers that have descriptions of oncology policies, service delivery and coverage in each country. Thirdly, the document analysis did not identify any current interactions, collaboration and evaluate the relationships established between the two countries on cancer or non-communicable diseases because we only focused on published documents.

Conclusion

In summary, the NCCP review has highlighted progress in South Africa and Brazil in terms of its scope and comprehensiveness to tackle the risks factors for CRC thereby addressing NCDs. It will be important to monitor implementation of these plans at regional level to ensure that cancer outcomes are improved at the population level through monitoring of national cancer registries.

There are notable efforts in both countries to align with WHO NCCP principles and components. The review of NCCPs in developing countries is an emerging field. Our effort to analyse the NCCPs in South Africa and Brazil is a unique contribution to the body of knowledge in this field.

Through this review, there are opportunities for further exploration of South Africa and Brazil current partnership with a focus on UHC and health advancement through support of NCDs, including cancer. In addition, the partnerships can develop innovations to address health inequities and monitoring and surveillance systems to accurately track trends in NCDs including cancer. This focused partnership could make the two countries be leaders among middle income countries in the fight against cancer and NCDs.

In conclusion, efforts to reduce risk factors for cancer, particularly, CRC and NCDs need to occur within universal health care coverage to ensure sustainability. The effective NCCPs remain a critical component of UHC for both South Africa and Brazil. Undoubtedly, periodic review of implementation and health system performance is necessary to identify gaps and implications as well as to propose new strategies for advancing the cancer control through the current corporation between the two countries. Key questions remain to be explored, including: 1) Does the South Africa public sector have the capacity to balance the ever-changing health needs caused by communicable and non-communicable diseases over time as both seem to have an upward trajectory? 2) What possible options are available to achieve health equity to effectively implement NCCP in all geographic regions in South Africa and Brazil? and 3) What are acceptable CRC screening procedures and implications for CRC screening of average risk-persons at primary health care level in both countries as related to CRC outcomes?

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