Tobacco control research in South Africa from 1978 to 2022: A scoping review

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Background. South Africa (SA) is one of the leading countries in tobacco control research in the African region.
Objective. To summarise this research over a 44-year period (1978 - 2022), and to identify research gaps.
Methods. This is a scoping review of published primary research on tobacco control in SA. Three databases were searched – PubMed, Scopus and Web of Science. A spreadsheet to capture specified details of the articles was designed by the researchers. We captured year of publication, names of authors and their affiliation(s), name of journal, title of article, key areas of tobacco control covered by the article, type of study and the funding institution.
Results. We identified 6 743 initial records. A total of 223 articles were included in the final analysis. The number of published primary research articles by year ranged from 1 in 1978 to 22 in 2022. Most studies (46.2%; *n*=103) focused on prevalence, while cost of e-cigarette use and industry interference received the least attention (0.4%; *n*=1 each). A total of 79% of the studies used cross-sectional survey design, followed by randomised controlled trials (3.6%; *n*=8), time series studies (3.1%; *n*=7) and longitudinal and qualitative studies (2.2%; *n*=5 each), while costs and benefits analysis (0.4%; *n*=1) was used much less. Most were published in the *South African Medical Journal*, and three of the top international tobacco control journals: *Tobacco Control*, *Nicotine and Tobacco Research* and *Tobacco Induced Diseases*. Almost half of the first authors of these publications are based in three institutions: the University of Cape Town (17.0%), the South African Medical Research Council (SAMRC) (16.1%) and the University of Pretoria (13.5%). SAMRC was found to be the leading funder of tobacco control research/publications in SA.
Conclusion. There has been a steady increase of tobacco control research in SA over the past 44 years, with a sharp increase within the last decade. Most studies used cross-sectional designs and focused on prevalence. More mixed-methods studies are needed to better understand the issue of tobacco in the SA context. More studies are also needed that focus on the impact of policies, nicotine addiction and industry interference. The continued funding of tobacco control research in SA will advance knowledge and inform tobacco control policies in the country.

Keywords: tobacco control, primary research, peer-reviewed, scoping review, South Africa

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Tobacco consumption is a leading cause of preventable deaths, accounting for the deaths of >8 million people annually across the world.[1,2] Over 7 million of those deaths are the result of direct tobacco consumption, and ~1.2 million are the result of exposure to second-hand smoke.[1,2] Over the past decades, tobacco use prevalence has been shifting from high-income countries (HICs) to low- and middle-income countries (LMICs). Currently ~80% of tobacco users live in LMICs,[3] which are home to 84% of the world's population.[4] Given constrained resources, the adverse public health and economic consequences of smoking in LMICs are considerably worse than in HICs.[3]

Within the African region, South Africa (SA), with a tobacco use prevalence of 29.4%,[5] has the highest tobacco use prevalence among the African countries that have implemented the Global Adult Tobacco Survey – a national household-level tobacco use surveillance instrument, which is part of the Global Tobacco Surveillance System.[6]

Data on tobacco smoking in SA show that smoking prevalence decreased from ~32% in the early 1990s to 20% in 2010.[7,8] This decrease in smoking prevalence has been attributed to rapid increases in the excise tax between 1993 and 2009, and strong tobacco control legislation.[9] SA was one of the first middle-income countries to use rapid excise tax increases as a tobacco control tool. For many years, SA was a model to other countries in tobacco control, especially because of the success of its excise tax policy.[10,11]

Results from the 2021 Global Adult Tobacco Survey show that nearly 26% of adult South Africans aged ≥15 years currently smoke tobacco.[5] Despite restrictions on tobacco advertising, the industry has been relentless in using alternative marketing approaches and novel nicotine products to target young people.[12] Another phenomenon that impacts on cigarette smoking prevalence is the availability of illicit cigarettes. The illicit market in SA has grown from 5% in 2009 to 58% in 2022.[13] These illicit cigarettes are sold at very low prices and make it easier for people who would otherwise not be purchasing cigarettes to smoke, and/or make smokers who would have quit owing to higher prices continue. These changes in the tobacco control landscape in SA suggest a need for evidence-informed legislative reform.

The Tobacco Products Control Act 83 of 1993 introduced health warnings and banned smoking on public transport, among other measures. The Tobacco Products Control Amendment Act 12 of 1999 banned all tobacco advertising, promotion and sponsorship, and made all public and work places smoke-free, but with provision for designated smoking areas. There have been three amendments (1999, 2007 and 2008) and six regulations passed (one in 1995, four in 2000 and one in 2011) for this 1993 Act. Since the last regulation in 2011, tobacco control policy in SA has stagnated. Whereas many other countries have implemented the provisions of the World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC),[14] including graphic health warnings, plain packaging and aggressive tax increases, SA has lagged behind. The MPOWER package is a set of six demand-reduction tobacco control measures drawn from the WHO FCTC to motivate countries to implement the FCTC more efficiently.[15] MPOWER stands for: (M) monitoring tobacco use and prevention policies, (P) protecting people from tobacco smoke, (O) offering help to quit tobacco use, (W) warning about the dangers of tobacco, (E) enforcing bans on tobacco advertising, promotion and sponsorship and (R) raising taxes on tobacco.[15] In 2018, the government first published the Control of Tobacco Products and Electronic Delivery Systems Bill, and in 2022 published a slightly revised version, which aims to make SA more compliant with the WHO FCTC. Informed by evidence from SA and internationally, the Bill aims, among other things, to introduce plain packaging with graphic health warnings, to ban all point-of-sale advertising, to ban the sale of tobacco products through vending machines, to make all public areas 100% smoke-free and to regulate electronic delivery systems. To date (September 2024), the Bill is still going through the legislative process to become law.

SA has a well-developed research infrastructure to inform public health policy and practice, with highly regarded universities and publicly funded science councils like the South African Medical Research Council (SAMRC) and the Human Sciences Research Council (HSRC). These universities and science councils have conducted research into tobacco control matters. The lead-up to the passing of the Tobacco Products Control Amendment Act of 1999 generated a lot of policy-relevant research (especially surveys) that informed the policy discussions.[16,17] Since the mid-1990s, tobacco control research has become mainstream in some SA institutions (specifically at the University of Cape Town (UCT) and the SAMRC).[18] Tobacco control research has become more internationalised, and better funded. The WHO FCTC, which officially came into being in 2005 but had a long gestation period, may have also created many opportunities for research worldwide. The 1990s and early 2000s saw the launching of a number of international journals specifically focused on tobacco (e.g. *Tobacco Control* in 1992, *Nicotine and Tobacco Research* in 1999 and *Tobacco Induced Diseases* in 2002).[19-21]

SA institutions have produced a lot of research in the tobacco control field. Some of this research was aimed to support specific policies (like the legislation of 1999),[17,18] while other research might have focused on aspects that the researchers found interesting. In this study, we summarise the published tobacco control research in SA, analysing, among other matters, trends in the number of publications per year, the key area(s) of tobacco control studied, the study designs applied, the institutions of first authors, and funders. Such knowledge will identify gaps in SA's tobacco control research. More specifically, it will identify study designs and research techniques that are lacking, and that can be used to fill in the identified research gaps.

Methods

Three databases were searched in July 2022 – PubMed, Scopus and Web of Science (WOS). Search terms were used to identify studies on tobacco control that have been conducted in SA. The search strategy included the following terms: Tobacco Products, Tobacco/Tobaccos, Smoking, Cigarette/Cigarettes, Cigar/Cigars, Nicotine, Snuff, Smokeless, Hookah, Shisha, Hubbly Bubbly, Kretek/Kreteks, Cigarillos, Bidi/Bidis, South Africa/South African. Tailored searches of the databases were developed using MeSH terms in PubMed and equivalent terms in the other databases. See appendix 1 (https://www.samedical.org/file/2301) for comprehensive search strategies used in this study. Abstracts identified were extracted to an EndNote database (Clarivate, USA) (6 743 abstracts) (Fig. 1).

The term 'tobacco products' used in this study is inclusive of products such as cigarettes, cigars, tobaccos, smokeless tobacco products and waterpipes (shisha, hubbly bubbly, hookah). Three research assistants reviewed the EndNote database and identified duplicates. An additional 30 articles were further identified by author CD to update the records up to the end of 2022. A total of 223 articles were included in the final analysis (appendix 2 https://www.samedical.org/file/2302).

Inclusion criteria

The criteria for the inclusion of articles for this scoping review included published scientific articles and letters and research studies. Articles that focused on tobacco and SA alone were included in the study. Tobacco-focused studies were defined as studies that included tobacco within their title, aims or objectives and as a keyword.

Exclusion criteria

The exclusion criteria were non-scientific articles and letters, article reviews, book reviews, commentary, reports, blog posts, editorials, non-empirical research articles, magazine and newspaper articles and systematic reviews. Studies that did not have a tobacco-related focus and/or did not include SA in their investigation were deemed ineligible for inclusion. Studies that did not include tobacco as one of the main variables studied, but rather as a co-variate among other variables, were not considered to fall under the definition of tobacco-related studies. Studies that included SA, as one of a number of countries studied, were excluded. Lastly, articles for which the researchers could not access their full texts for accurate determination of their fit for inclusion were also excluded from the analysis.

Data extraction

Following the guide provided by the inclusion and exclusion criteria, an Excel (Microsoft, USA) spreadsheet was created to document the following details for each article: year of publication, names of authors, journal name, title of article, key area of tobacco control, type of study and authors' main affiliation.

The full texts of 406 articles were downloaded and reviewed by COE, SG, CvW and CD, and a total of 223 was agreed upon by all authors as the final data to be included in the analysis.

Data analysis

After extracting the relevant data into a spreadsheet, trends in the number of publications per year (and per decade), the key area(s) of tobacco control studied, the study designs applied, the institutions of first authors, and funders were summarised using graphs and descriptive statistics (percentages and frequencies) in Excel.

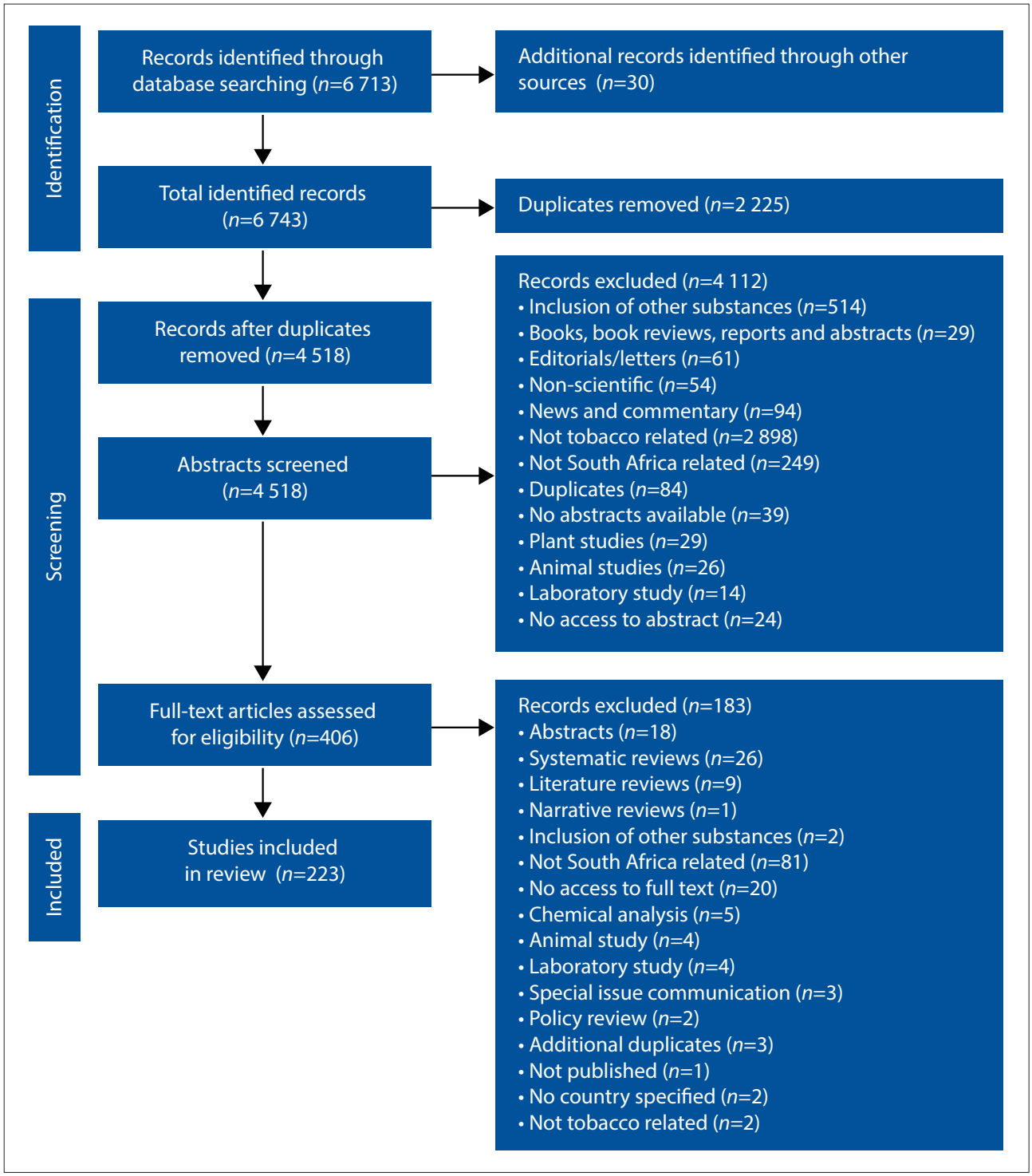

Fig. 1. PRISMA flow chart of scoping review on primary tobacco control research in South Africa.

Results

Published primary research in SA witnessed an upward trend, subject to some fluctuations, over the 44-year period. The number of articles published per year ranged from 1 in 1978 to 20 in 2022. Most of the articles were published after 2000 (*n*=190, 85.2%), and the majority were published between 2013 and 2022 (*n*=122, 54.7%) (Fig. 2).

Publication by study type

Fourteen types of study designs were documented for all 223 articles included in the analysis (Table 1). A total of 79.4% were cross-sectional observational studies (*n*=177). These studies included, among others, prevalence studies, surveys about knowledge, attitudes and perceptions towards smoking and tobacco control interventions and exposure to second-hand smoke. Eight (3.6%) were randomised controlled trails, and five (2.2%) each were based on longitudinal and qualitative studies. Four (1.8%) of the publications used mixed methods in their study design and three (1.3%) each were clinical trials and quasi-experimental studies.

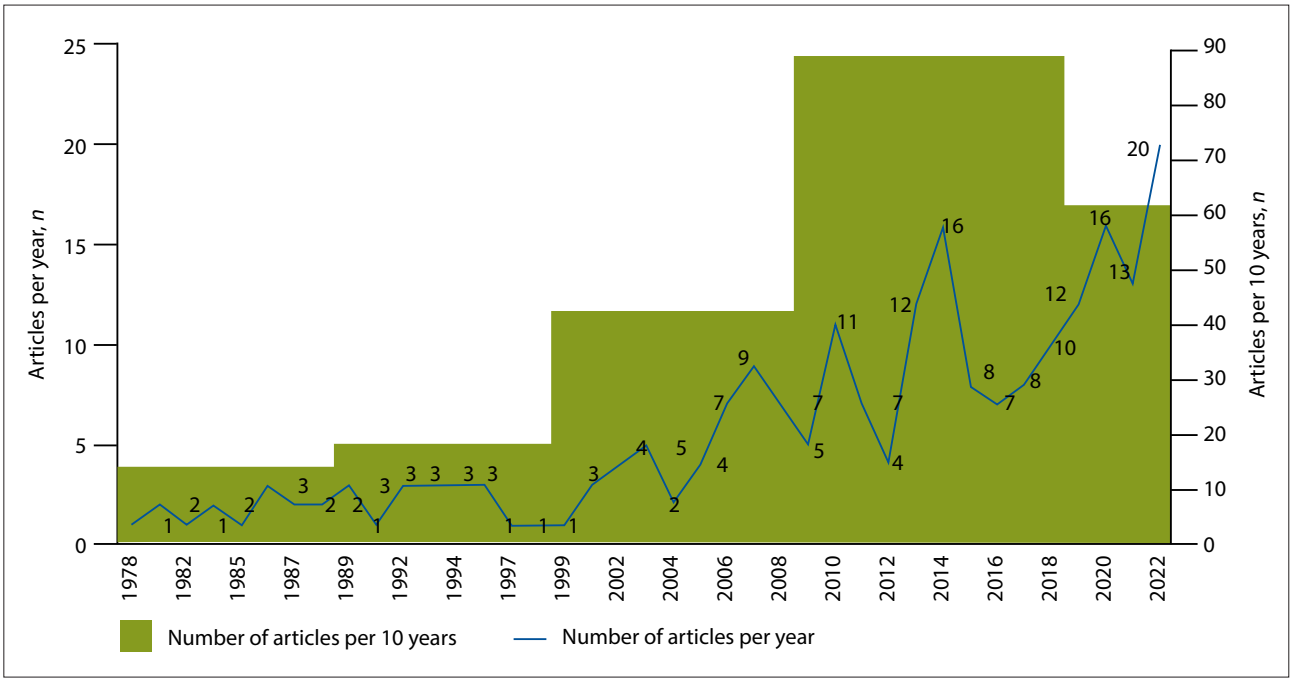

Fig. 2. Number of articles published by year and decade for the period 1978 - 2022.

Table 1. Breakdown of articles by type of study design

Type of study	*n* (%)
Cross-sectional study	177 (79.4)
Randomised controlled trial	8 (3.6)
Time series study	7 (3.1)
Longitudinal study	5 (2.2)
Qualitative study	5 (2.2)
Case study	4 (1.8)
Mixed methods	4 (1.8)
Clinical trial	3 (1.3)
Quasi-experimental study	3 (1.3)
Cohort study	2 (0.9)
Retrospective study	2 (0.9)
Simulation	2 (0.9)
Costs and benefits	1 (0.4)
Total	223 (100)

Publication by tobacco control focus area

The specific research area in tobacco control each of these published studies focused on is presented in Table 2. Almost half of the publications were prevalence studies (*n*=103; 46.2%). Of the 103 studies that focused on prevalence, 36.9% (*n*=38) focused on smoking prevalence, 16.5% (*n*=17) focused on tobacco use prevalence while 10.7% (*n*=11) investigated cessation. Six studies each (5.8%) investigated the health impact of tobacco use and waterpipe use, while 4.9% (*n*=5) investigated predictors of smoking. Dual use, exposure to second-hand smoking, perception and tobacco-attributable mortality were investigated by 1.9% (*n*=2) each, while prevalence of e-cigarette use, smoking initiation and intensity were investigated by 1.0% (*n*=1) article each.

Forty-three articles investigated the harms caused by tobacco (19.3%). Of these 43, 74.0% (*n*=32) focused on clinical harms, while 26.0% (*n*=11) investigated social/economic harms. Only one study (0.4%) each reported research conducted on the cost of e-cigarette use and tobacco industry interference (Table 2). Using the MPOWER themes, 57.0% (*n*=127) of the articles focused on monitoring tobacco use and prevention policies, and 19.0% (*n*=43) focused on warning about the dangers of tobacco.

Publication by journal

Table 3 presents the journals in which most SA tobacco control research studies have been published. Only journals that have published ≥2 articles are presented here. The results show that a fifth of the articles were published in the *South African Medical Journal* (*SAMJ*) (*n*=43; 19.3%). This was followed by *Tobacco Control*, a British medical journal (*n*=20; 9.0%) and *Nicotine and Tobacco Research*, an Oxford Academic Press journal (*n*=12; 5.4%). A total of 37 (16.6%) of the studies have been published in the three top international tobacco control journals globally, namely *Tobacco Control*, *Nicotine and Tobacco Research* and *Tobacco Induced Diseases* (Table 3). Of the top 11 journals where ≥3 SA research studies have been published, two (*SAMJ* and *South African Family Practice*) are national journals.

Publication by affiliation of first authors

We assessed the first affiliation of the lead authors of all articles included in the study (Table 4; also see appendix 1 for full details of authors' affiliations). Of the 22 institutions with ≥2 publications, 14 are SA institutions. The results also show that 46.6% of the publications (*n*=104) have first authors from three institutions in SA: the University of Cape Town (UCT) (*n*=38; 17.0%), the SAMRC (*n*=36; 16.1%) and the University of Pretoria (UP) (*n*=30;13.5%).

Publication by funding agency

Funding agencies reported by authors in their publication were also assessed in this study. Only funding agencies or institutions that have funded ≥2 publications are presented in Table 5. Of the 223 studies considered, 112 did not indicate the name of the funding agency. Of the remaining 111 studies, 55 indicated only one funding source, while 57 indicated more than one funding source. A total of 218 funding institutions were recorded. All the funding agencies that were acknowledged at least twice are listed in Table 5.

Table 2. Breakdown of articles by key focus area of tobacco control

Key area of tobacco control	MPOWER theme*	*n* (%)
Prevalence	M	103 (46.2)
Harms of tobacco	W	43 (19.3)
Cessation	O	17 (7.6)
Knowledge, attitudes and perceptions	P	10 (4.5)
Tobacco control policy	M	9 (4.0)
Illicit tobacco	R	9 (4.0)
Prevention	M	7 (3.1)
Cost of smoking	M	6 (2.7)
Taxation/price	R	6 (2.7)
Tobacco advertising, promotion and sponsorship	E	5 (2.2)
Addiction	O	2 (0.9)
Exposure to second-hand smoke	P	2 (0.9)
Policy impact: taxation and smoke-free	R/P	2 (0.9)
Cost of e-cigarette use	M	1 (0.4)
Industry interference	M	1 (0.4)
Total	-	223 (100)

*(M) monitoring tobacco use and prevention policies, (P) protecting people from tobacco smoke, (O) offering help to quit tobacco use, (W) warning about the dangers of tobacco, (E) enforcing bans on tobacco advertising, promotion and sponsorship, (R) raising taxes on tobacco.

Table 3. Breakdown of where South African tobacco research is published

Journal title	*n* (%)
South African Medical Journal	43 (19.3)
Tobacco Control	20 (9.0)
Nicotine & Tobacco Research	12 (5.4)
PLOS One	6 (2.7)
BMC Public Health	6 (2.7)
BMJ Open	6 (2.7)
International Journal of Environmental Research and Public Health	6 (2.7)
South African Family Practice	5 (2.2)
Tobacco Induced Diseases	5 (2.2)
Midwifery	3 (1.3)
Preventive Medicine Reports	2 (0.9)
Southern African Journal of HIV Medicine	2 (0.9)
Social Science & Medicine	2 (0.9)
Preventive Medicine	2 (0.9)
International Journal of Behavioral Medicine	2 (0.9)
South African Journal of Economic and Management Sciences	2 (0.9)
American Journal of Health Behavior	2 (0.9)
Addiction	2 (0.9)
BMC Family Practice	2 (0.9)
Ethnicity and Disease	2 (0.9)
Trends in Organised Crime	2 (0.9)
African Journal of Primary Health Care and Family Medicine	2 (0.9)
South African Journal of Economics	2 (0.9)
Health Education Research	2 (0.9)
South African Journal of Psychiatry	2 (0.9)
British Journal of Cancer	2 (0.9)
BMC Pediatrics	2 (0.9)
Drug and Alcohol Dependence	2 (0.9)
Paediatric and Perinatal Epidemiology	2 (0.9)
International Journal of Tuberculosis and Lung Disease	2 (0.9)
Journal Of Adolescent Health	2 (0.9)
Journal of Behavioral Medicine	2 (0.9)
Other (*n*=1)	67 (29.9)
Total	223 (100)

Table 4. Articles, *n* (%), by first author's main affiliation

First author's affiliation	*n* (%)
University of Cape Town, South Africa	38 (17.0)
South African Medical Research Council, South Africa	36 (16.1)
University of Pretoria, South Africa	30 (13.5)
University of the Witwatersrand, South Africa	15 (6.7)
Stellenbosch University, South Africa	9 (4.0)
University of the Western Cape, South Africa	7 (3.1)
Johns Hopkins University, USA	7 (3.1)
Sefako Makgatho Health Sciences University, South Africa	6 (2.7)
University of Limpopo, South Africa	5 (2.2)
Maastricht University, the Netherlands	4 (1.8)
Human Sciences Research Council, South Africa	4 (1.8)
New York University School of Medicine, USA	4 (1.8)
Harvard University, USA	3 (1.3)
University of Namibia, Namibia	3 (1.3)
University of KwaZulu-Natal, South Africa	3 (1.3)
National Health Laboratory Service, South Africa	3 (1.3)
University of the North, South Africa (merged with Medical University of Southern Africa to form the University of Limpopo in 2005)	3 (1.3)
University of Fort Hare, South Africa	2 (0.9)
Georgia State University, USA	2 (0.9)
University of Michigan, USA	2 (0.9)
Centre for Epidemiological Research in Southern Africa, South Africa	2 (0.9)
University of Southern California, USA	2 (0.9)
Other (*n*=1)	33 (14.7)
Total	223 (100)

Results show that the SAMRC is the leading funder of tobacco control research/publications (*n*=22; 10.1%), followed by the National Research Foundation of SA (*n*=15; 6.9%), the International Development Research Centre (*n*=11; 5.0%) and the African Capacity Building Foundation (ACBF) (*n*=10; 4.6%) (Table 5). Although ACBF is funded by the Bill & Melinda Gates Foundation, we only counted articles that directly mentioned a funder. Of the 30 institutions that funded at least two publications, 33.3% (*n*=10) are SA institutions.

Discussion

The purpose of this scoping review was to investigate the primary research literature, in the form of published articles, on tobacco control in SA over a 44-year period (1978 - 2022). Overall, 223 peer-reviewed articles on tobacco control research in SA that met the inclusion criteria were identified.

SA was a global leader in tobacco control between the early 1990s and 2005. It passed progressive tobacco control legislation (specifically the Tobacco Products Control Amendment Act of 1993), long before the WHO FCTC was in place. It was one of the first middle-income countries to raise tobacco excise taxes, with the specific aim to reduce tobacco consumption. In fact, SA's experience with tobacco taxation substantially informed the policy documents that are associated with Article 6 (tax and price measures) of the WHO FCTC.[11]

The health policy adopted by the democratically elected government in 1994 specifically focused on preventive rather than curative interventions. Reducing tobacco use is a highly effective preventive intervention. The number of published articles on tobacco control steadily increased from the late 1990s, but these increases were steeper from the year 2010, and are indicative of the interest that the scientific and public health community took in the changing tobacco and health policy environment.

Our results show that the majority (79.4%) of the articles were cross-sectional studies, while only 3.6% were randomised controlled trials and 2.2% each were longitudinal and qualitative studies. Cross-sectional studies provide scientific evidence for tobacco control; however, although they can only establish associations and do not imply causation,[22] they may be the most appropriate source of evidence (therefore research) in many instances, including assessing knowledge, attitude and perceptions and general exposure to second-hand smoke. The findings of this study are consistent with a 2018 systematic review of the designs and methods of tobacco control research in sub-Saharan Africa, which shows that very few qualitative and mixed-methods studies are being conducted in the region.[22]

The high number of cross-sectional studies can be attributed to the fact that this type of approach is usually less expensive to conduct relative to other study designs such as cohort studies and randomised controlled trials.[23] However, considering that cross-sectional studies only measure a single moment in time, they cannot be used to analyse individual behaviour over time, or to establish long-term trends.[24] It must also be noted that cross-sectional studies could be the most appropriate way to answer certain research questions, such as on changing knowledge, attitudes and perception about tobacco use over time, types of products in the market as well as some policy-related research. Given the wide use of tobacco for traditional ceremonies in Africa,[25,26] SA inclusive,[27] it may be beneficial to the field if more qualitative studies are conducted first to understand the role of tobacco in culture and traditions, and also understand how the popularisation of commercial tobacco may have impacted such cultures and traditions.[26] Egbe *et al.*[26] documented the emergence of hybridised cultures around commercial tobacco use in Nigeria, and sociocultural factors impact on the smoking behaviour of young people. Rich qualitative studies are also needed in SA to unpack the cultural dynamics associated with tobacco use.

Table 5. Articles, *n* (%), by funder and origin

Name of funding organisation (country/region located)	*n* (%)
South African Medical Research Council (South Africa)	22 (10.1)
National Research Foundation of South Africa (South Africa)	15 (6.9)
International Development Research Centre (Canada)	11 (5.0)
The African Capacity Building Foundation (African Union)	10 (4.6)
Bill & Melinda Gates Foundation (USA)	9 (4.1)
National Institute on Drug Abuse (USA)	9 (4.1)
Research for International Tobacco Control (Canada)	8 (3.7)
National Institutes of Health Fogarty International (USA)	8 (3.7)
American Cancer Society (USA)	7 (3.2)
Cancer Association of South Africa (CANSA) (South Africa)	7 (3.2)
Cancer Research UK (UK)	6 (2.8)
South African National Department of Health (South Africa)	4 (1.8)
Carnegie Foundation, New York (USA)	3 (1.4)
Global Bridges Health Care Alliance for Tobacco Dependence Treatment (USA)	3 (1.4)
Economic Research Southern Africa (South Africa)	3 (1.4)
University of the Witwatersrand (South Africa)	3 (1.4)
National Cancer Institute (USA)	3 (1.4)
Koninklijke Nederlandse Centrale Vereniging Tuberculosis Foundation (the Netherlands)	3 (1.4)
The (South African) National Health Laboratory Service (South Africa)	2 (0.9)
United Nations Children's Fund (UNICEF) (Global)	2 (0.9)
The Wellcome Trust (UK)	2 (0.9)
Foundation Study Fund for South African students in the Netherlands (the Netherlands)	2 (0.9)
Bill & Melinda Gates Foundation (through the African Capacity Building Foundation) (US/African Union)	2 (0.9)
The Heart Foundation of South Africa (South Africa)	2 (0.9)
Health and Welfare Sector Education and Training Authority, South Africa (South Africa)	2 (0.9)
UK Research and Innovation (UK)	2 (0.9)
National Center for Chronic Disease Prevention and Health Promotion (USA)	2 (0.9)
University of Cape Town (South Africa)	2 (0.9)
Canadian Institutes of Health Research (Canada)	2 (0.9)
Tobacco Control Capacity Programme (UK)	2 (0.9)
Other	60 (27.5)
Total	218 (100)

Almost half of the publications focused on tobacco use prevalence, while 19% focused on the harms of tobacco. Evidence generated from these studies is of particular importance in informing policy-makers about the effects of tobacco. The increase in the number of prevalence studies coincides with the decline in the national smoking prevalence rates from 32% in 1994 to 20% in 2010.[7,8] This decrease in smoking prevalence corresponds to the period where the SA government adopted aggressive tobacco control measures, including rapid tax increases and strong legislation.[9] However, with the introduction of new products in the tobacco/nicotine market such as e-cigarettes and nicotine pouches, more comprehensive legislation is needed to ensure that all products are brought under the relevant regulatory framework, in order to better protect public health. SA is currently processing a new bill, the Tobacco Products and Electronic Delivery Systems Control Bill of 2022, which, if passed, would bring all tobacco and related products, such as e-cigarettes, under the same regulatory framework.[28,29]

Industry interference and e-cigarette use prevalence received the least attention from researchers in the period under scrutiny. E-cigarettes were only recently introduced in the SA market, hence this is not a surprise; however, these products have gained wide popularity, especially among young people, though the prevalence rate is still <3%.[5] It is also worthy of note that the tobacco/electronic cigarette industry is known to use discussions around e-cigarette use by those who currently smoke to influence discourse about proposed tobacco control legislation in SA.[30] Given the popularity of e-cigarettes, and the significant role played by the industry in influencing tobacco control policies in SA,[31,32] these research areas should be given more attention, without sacrificing other research needs. Such knowledge is particularly important for policy-makers in reviewing tobacco control policies.

About 19.0% of the articles published in SA were published in the *SAMJ*. The *SAMJ* is a national peer-reviewed open-access general medical journal with regional reach, which has been published in SA since 1884.[33] It is therefore encouraging to see the journal take the lead in publishing SA studies on tobacco control research.

The majority of the publications were published by first authors who were/are affiliated with UCT (17.0%), SAMRC (16.1%) and UP (13.5%). UCT was the first SA institution to focus on the *economics* of tobacco control. UCT's Research Unit on the Economics of Excisable Products (REEP) hosts the WHO FCTC secretariat's Knowledge Hub on Tobacco Taxation.[34] Other than conducting and facilitating research in the economics of tobacco control (in SA and more broadly), the unit, through the knowledge hub, provides technical support to individual countries on issues related to tobacco taxation and/or illicit trade.[35] The SAMRC is one of SA's science councils,[36] and has a mandate to conduct research on SA's quadruple burden of disease: maternal, newborn and child health; HIV/AIDS and TB;

non-communicable diseases; and interpersonal violence.[37] Tobacco is a leading cause of NCDs,[38] and is also associated with worsening of TB and HIV/AIDS outcomes.[39] Our results also show that the SAMRC is the leading funder of tobacco control research in SA, which aligns with its statement as to being the largest local funder of health research in SA.[37]

It is important to note that the third-placed institution (UP) with regard to authors' first affiliation also hosts the Africa Centre for Tobacco industry monitoring and policy research,[40] which is a knowledge hub on tobacco industry monitoring – a WHO FCTC secretariat-designated industry-monitoring observatory. We posit that the volume of publications affiliated to these top institutions is indicative of the roles these institutions have been playing in public health and tobacco control both nationally and at a global level.

Study limitations

This scoping review did not seek to assess all SA publications on tobacco control research, but all published SA primary research articles on tobacco control. We therefore excluded systematic reviews to avoid duplications. Also, we did not seek to evaluate the quality of the research or its detailed content, as these do not fit within the scope of our research. We have excluded articles published in 2023 because the primary data collection for this study ended in the early months of 2023. This study only utilised three databases to retrieve peer-reviewed articles from SA. We only included peer-reviewed scientific publications, and excluded grey literature. Furthermore, studies that included tobacco as a covariate and/or included SA as one of multiple countries were also excluded. The categorisation of key areas of tobacco control may be considered subjective, given that many articles covered more than one area; however, consensus was reached by all authors on the best fit for each article. Lastly, the researchers only included studies where they were able to access their full texts, and excluded studies with no such access, which may have reduced the actual number of published studies.

We believe that the findings of this article are important for providing an overview of tobacco control research in SA, showing the gaps and strengths, and possibly indicate the direction this field of research should be focusing on going forward.

Conclusion

This scoping review reveals that the number of studies published on tobacco control in SA has increased steadily over the past 44 years, with a steeper increase since the year 2010. However, there is still a need for more research, particularly using clinical trials, cohorts, mixed methods and qualitative research designs, as these studies would provide more in-depth knowledge on tobacco use and behaviour. Continued funding and authorship by researchers and institutions in SA will fill the knowledge gaps and advance tobacco control research domestically and abroad.

Data availability. Data used in this study are available in appendix 1. Additional data can be provided upon reasonable request from the lead author.

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Conflicts of interest. None.

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