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A brief narrative on *SAJS* communications on selected disease outbreaks of global significance in the last 120 years

Significance:

The *South African Journal of Science (SAJS)* is a multidisciplinary journal serving as an outlet for researchers' findings, opinions and perspectives, with a primary focus on South Africa and the African continent. The Journal aims to communicate to the general non-expert readership. In this Perspective, we aim to provide a brief overview of how the Journal has communicated disease outbreaks of global importance over the decades. *SAJS* is in a good position to contribute to the public understanding of biomedical science through periodic calls for contributions on emerging and re-emerging pathogens that have the potential to cause disease outbreaks.

Introduction

The role of a scientific journal is to disseminate findings judged to be of a generalisable nature, reliable, and of interest to its readership.[1,2] Disease outbreaks come with huge tolls in sickness and deaths, with far-reaching effects on the psychosocial and socio-economic well-being of communities and countries.[3–6] In times of disease outbreaks, researchers generate and communicate information in an effort to support control and prevention strategies in order to improve the well-being of the affected populations.[7]

As we commemorate and reflect on the journey of the *South African Journal of Science* (*SAJS*) since its debut 120 years ago, it is worthwhile to examine what has come through its pages in keeping with its goal of providing information to its readership in South Africa, Africa and beyond. The Journal is multidisciplinary and aims to communicate with a non-expert readership. In this commemorative article, we aim to briefly describe the nature and diversity of articles published in the Journal on selected disease outbreaks of global significance in these past 120 years.

Methodology

To achieve our objective, we used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) approach. The electronic search was conducted between 30 March and 3 April 2024 to identify Research Articles, Commentaries, Book Reviews and Perspectives, among others, in *SAJS* that reported on a selection of disease outbreaks that triggered interventions of the scale requiring isolation or for which specific treatment was not readily available, and of global significance. Publications on the bubonic plague, Spanish flu, Ebola, acquired immune deficiency syndrome (AIDS), severe acute respiratory syndrome (SARS), Middle East respiratory syndrome (MERS) and coronavirus disease 2019 (COVID-19) were sought. The following search strategy was used: "Pandemic and bubonic plague" OR "Epidemic and bubonic plague"; "Pandemic and spanish flu" OR "Epidemic and Spanish flu"; "Pandemic and Ebola" OR "Epidemic and Ebola"; "Pandemic and AIDS" OR "Epidemic and AIDS" OR "Pandemic and HIV" OR "Epidemic and HIV"; "Pandemic and SARS" OR "Epidemic and SARS"; "Pandemic and MERS" OR "Epidemic and MERS"; and "Pandemic and COVID-19" OR "Epidemic and COVID-19" OR "Pandemic and SARS-CoV-2" OR "Epidemic and SARS-CoV-2". The search, with no time limits, was conducted independently by two researchers.

Search and selection criteria

A total of 267 communications in *SAJS* were identified. Of these, 55 met the inclusion criteria for disease outbreaks for which no specific treatment was readily available or required isolation to control it, and that were of global significance (Figure 1). These communications were used for the narrative.

Narrative

The communications identified were published between 1905 and 2023. A brief overview of the content of the communications is hereby given.

In 1905, Mitchell[8] described the occurrence of **bubonic plague** (the Black Death) in the then Cape Colony of South Africa. The report, on a request from the Editor of *SAJS*, detailed the first cases of bubonic plaque around the ports of Cape Town, Port Elizabeth (now Gqeberha) and East London from 1900, and the subsequent spread of the disease to outlying settlements and to Johannesburg and Pretoria. Also, details are provided on control measures implemented, including isolation of infected persons and contacts; disinfection of ports, homes, merchandise, and sea vessels; inspection of homes and docking ships to eliminate rats and mice; screening and disposal of contaminated merchandise and forage; and inoculation efforts. **Spanish flu** was recounted decades later, in 2020[9], in the form of a Book Review citing other published sources between 1970 and 1980. The review revealed a grim picture of communities facing an illness of unknown origin with little hope of survival for those infected.

A few reports were published between 2014 and 2017 covering several aspects of **Ebola.** For example, a bibliographic analysis revealed that published research on Ebola increased markedly between 1991 and 2013.[10] Information reported included description of the viral genome and determinants for better diagnosis and treatment of the disease. Other articles were aimed at improving public understanding of the origin, control and prevention of

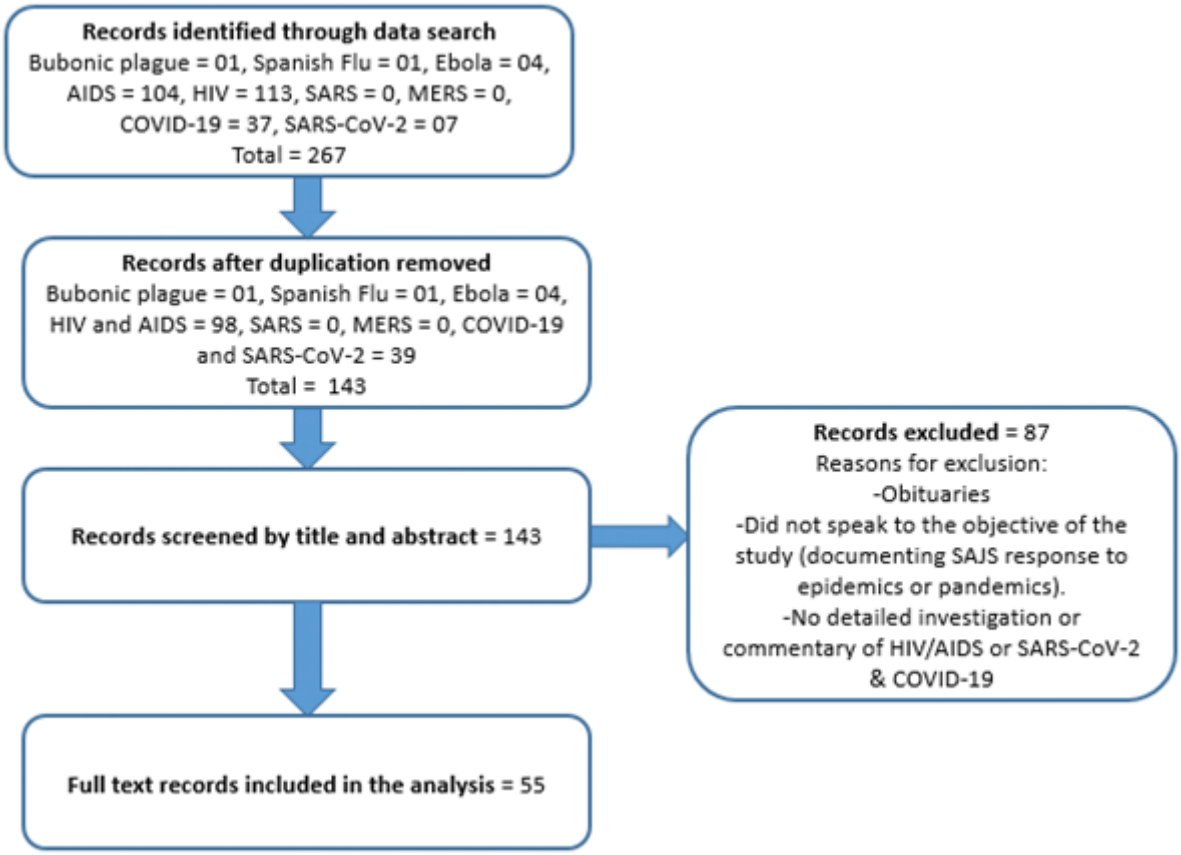

Figure 1: PRISMA flowchart on the screening and selection of studies used for analysis on disease outbreaks of global significance.

Ebola.[11–13] This was in reaction to negative rumours and theories about the true intentions and roles of governments of the Global North and pharmaceutical companies which promoted rejection of the scientific explanation of the origin of Ebola.

HIV/AIDS has featured quite prominently in *SAJS*. This is expected as South Africa continues to have one of the highest prevalence rates of HIV infections[14], with immense human and socio-economic consequences[15,16]. The contributions were in the form of original Research Articles, Research Briefs, News articles, Commentaries and Book Reviews by South African and international authors. Papers on the search for alternative treatments or control measures for HIV/AIDS include the use of medicinal plants such as *Sutherlandia frutescens, Bulbine natalensis* (rooiwortel) and *Hypoxis hemerocallidea* (African potato)[17,18], the use of plant systems to express components for microbicides[19], and contaminants in herbal preparations used by people living with HIV[20,21]. Investigations on repurposing drugs in an effort to clinically manage AIDS were also reported; for example, the screening of a US National Institutes of Health collection for potential inhibitors to HIV integrase.[22] On the relationship between HIV/AIDS and the environment, Kaschula and Shackleton[23] showed that, although the disease negatively impacted poor rural households, there was no correlation between poverty due to HIV/AIDS and increased use of wild animal products.

A Book Review examining conspiracies on the disease addressed fundamental challenges in the understanding of science by the broader society.[24] The review highlighted the undesirable impact that false theories on AIDS have had on the survival of AIDS patients and on populations at risk for HIV acquisition. The denialist policies of the government under former President Thabo Mbeki were brought to the fore. The review explained why these beliefs exist and emphasised the importance for science to succeed in rationally dispelling denialist beliefs and conspiracies.[11,24,25] On the long-term management of HIV/AIDS, *SAJS* communicated on South Africa's contributions to the development of HIV vaccines, and on the initial National Strategic Plan (2007–2011) to address the huge burden of HIV/AIDS infections by accelerating access to treatment.[26,27]

The association of HIV infection and neurocognition is an important mental health issue.[28] A meta-analysis[29] in *SAJS* reported a high prevalence of HIV-associated neurocognitive disorders (HAND) in sub-Saharan Africa and described factors affecting prevalence estimates of HAND. However, it remained to be seen what the impact of HAND would be on daily activities of affected individuals as well as the plausible therapeutic modalities.

The impacts of psychosocial and economic factors, such as stigma, food insecurity and poor adherence to treatment, on the outcomes of HIV testing uptake and progress in achieving the then UNAIDS 90-90-90 targets were also reported.[30,31] On co-infections, a Commentary by Mpaka-Mbatha and colleagues[32] discussed the immunological interaction between helminthic and HIV co-infections, highlighting the need for integrative research in sub-Saharan Africa. Management and translation of large-scale population-based data sets could hold answers to several global health challenges.[33] In this regard, one Perspective[34] described how the population-scale data streams and tools as used in the INFORM-Africa Consortium can be used to plan for future pandemics.

Women's health and HIV also formed part of the Journal's communications. This included the limits of observational epidemiology, and hormonal contraception and women's risk for HIV infection.[35] The relationship between components in HIV treatment regimens and expression of BAX and BCL2 genes in breast cell lines was reported.[36] Other pages highlighted the need for significant participation and retention in order to have reliable outcomes in HIV prevention clinical trials. Related to this, were the reasons for missed visits and strategies to reduce loss to follow-up in clinical trials, to guarantee reliable data sets.[37,38]

The Journal served as an outlet for a variety of contributions on **COVID-19** and SARS-CoV-2, the causative virus. On human communication, no one was prepared for a 'shutdown of communication' due to masks worn over noses and mouths, in the face of a raging virus, which also masked elements required for oral and physical communication.[39] Views on how the virus significantly challenged sustainable development efforts[40], and how the virus diminished moral support provided by families, communities, and religious organisations were expressed.[41] From an economic

perspective, some reports investigated the 'shock' the South African economy suffered and compared it to the consequences experienced during the Spanish flu.[42] The economic vulnerability of shack-dwellers in South Africa compounded the difficulty of residents in these precincts to comply with COVID-19 restrictions, calling for sensitivity to these types of particular situations, and the need for special attention to unemployment among the urban poor, and the long-term outlook on employment.[43,44] During the pandemic, scientists recognised the increased influence the media played in the public and policy spheres, and they reflected on the implications and consequences of a skewed media representation of scientific expertise, as well as some of the options to remedy biased reporting.[45] Inequalities in attaining education brought by the pandemic were discussed. For example, a widening in the gap in the career and life chances of learners with adequate access to personal and educational resources and structures, compared with individuals without these resources.[46] One report shed light on the effect of the COVID-19 outbreak on schooling, especially in resource-constrained areas, and discussed the merits of counselling for career development as an intervention that could bring about transformative change and bring back hope and purpose among students.[47]

Van Wyk and Reddy[48] described how the application of governance systems can give rise to unintended social consequences when the evidence upon which the systems are based is not suitably tailored to meet the needs of specific realities and contexts. Their article highlighted how informality can play a valuable role in fighting a disease outbreak and suggested that, to enhance success, the government should include rather than override informal principles of governance. A case study[49] investigated the precarity of women's academic work and careers during the COVID-19 pandemic. The authors made suggestions for higher education institutions to remedy the negative consequences of the pandemic lockdown on women's academic work and their professional futures.

The strong association of visual, musculoskeletal and developmental impairments and prolonged use of electronic devices during the COVID-19 pandemic and the potential burden on an over-stretched primary healthcare system was also highlighted by Chetty and colleagues[50]. Beyond COVID-19, with the increasing use of electronic devices, the lessons learnt remain valid for the adoption of appropriate measures to minimise the adverse effects of screen time on eye and musculoskeletal health.[50] A Book Review[51] discussed relationships between the COVID-19 outbreak and the political economy within which human health is governed. Recommendations for South African researchers to leverage past investment in HIV vaccine research to understand the immunology of SARS-CoV-2[52,53], and on access and equity to COVID-19 vaccines, diagnostics and treatment options[54], were highlighted.

Several other topics on COVID-19 were published in *SAJS*. Briefly, these included a call for caution in the critical use of predictive models for COVID-19 prevalence[55]; the poor quality of a substantial proportion of hand sanitisers[56]; the lack of COVID-19 vaccine trials in Africa[57]; the connections between COVID-19, global health, and climate change and social medicine[58,59]. In addition to these, views also featured were on the ethics of COVID-19 vaccine mandates post the Omicron variant[60], and the ethics in obtaining electronic consent for research involving humans[61]; cell phone mobility-derived data[62]; and the rise in psychopathologic challenges brought about by COVID-19[63].

Data collection, sharing and use remains a tenuous issue in health emergencies. It was suggested[64,65] that, in the face of different national guidelines, a platform would be required to facilitate the collection, transfer and use of data across the borders of different countries for global health imperatives during health emergencies. Quarantine and restrictions on mobility and potentially confounding factors are historically common in infectious disease outbreaks.[66] Thus, appropriate predictive models can provide guidance for the selection of mobility restriction policies with minimum negative effects on the socio-economic status of communities.[67]

Discussion and conclusion

Disease outbreaks impact human health in several ways and holistic research approaches are therefore necessary to ensure the overall well-being of the affected individuals and communities. This Perspective suggests that the Journal communicated diversely on more recent disease outbreaks of global significance, such as HIV/AIDS and COVID-19, than on earlier ones such as Spanish flu, bubonic plague, SARS and MERS. This could probably be attributed to a combination of factors. First, the infancy, and the very small scientific research community in the early decades of the Journal's existence. The single report on bubonic plague in *SAJS* in 1905 by Dr Mitchell[8], which was submitted by invitation, may be a reflection of the situation then. Second, the pursuit of higher education training and scientific investigation has not always been open to all in South Africa, with devastating consequences for human capital development for the majority non-white population and the country as a whole.[68–70] The political dispensation, post-1994, ushered in a period of improved access to training and skills acquisition in biomedical and clinical research to all demographic strata of the society. This trend has continued, albeit with teething challenges emanating, to a substantial extent, from the segregation and apartheid laws of the past.[71,72] In this regard, the Journal is now receiving submissions on research findings and opinions from a much more diverse group of researchers. Third, the threats to South Africa and Africa from disease outbreaks such as SARS and MERS were minimal compared with those from HIV/AIDS and COVID-19. It appears that local immediate relevance is an important trigger for scientific enquiry. For example, prior to COVID-19, very little research on coronaviruses took place in Africa.[73] Fourth, *SAJS* is one of several journals in South Africa and southern Africa that researchers may choose as an outlet for their research findings. This includes journals that are more medically focused.

The present Perspective is by no means exhaustive. It does not cover other diseases of public health importance for South Africa and Africa such as tuberculosis, smallpox, measles, and cholera. Nevertheless, this brief narrative on what *SAJS* has communicated on a selection of disease outbreaks of global importance over the decades demonstrates the Journal's increasing interest and commitment in informing its broad readership on research and perspectives on disease outbreaks of global significance. In addition, it would be of interest to understand the extent to which the apartheid system influenced the editorial policy of *SAJS,* and by extension, what the Journal published then on health matters for the benefit of the greater society. Currently, there is appreciation of the need for preparation in order to prevent or respond to future global disease outbreaks.[74] We are of the view that the same desire should be applied to potential disease outbreaks of a national or regional nature. In this regard, *SAJS* can play a significant role in keeping this desire alive by issuing periodic calls for research findings and opinions on emerging and re-emerging pathogens and their potential to cause outbreaks, both in the country and on the African continent.

Declarations

P.O.B. is the *SAJS* Associate Editor and M.J.R. is the *SAJS* Associate Editor Mentee for Cell, Molecular and Health Sciences. P.O.B. receives funding for antimicrobial resistance and global health research from the South African Medical Research Council. There is no AI or LLM use to declare. The opinions expressed herein are those of the authors and are not necessarily the views of their affiliations or funders.

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