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The epidemic–terrorism nexus and how to safeguard Africa against bioterrorism: Lessons from the Global Polio Eradication Initiative?

Kayla Arnold

University College London, London, United Kingdom

ABSTRACT

Bioterrorism – the manipulation of disease crises by terrorist groups to achieve political aims – is an under-researched threat to Africa. The increasing frequency of epidemics and pandemics such as Ebola and Covid-19, concurrent with the regional increase in terrorism, increases the potential for disease crises to be exploited as political weapons by terrorist groups, either directly or indirectly. This paper produces insights about the intersection of terrorism and disease in Africa through the exploration of terrorism’s interaction with the Global Polio Eradication Initiative (GPEI), with reference to targeted violence, anti-vaccination rhetoric and anti-West suspicions in Nigeria, Pakistan and Afghanistan. Terrorism is shown to be significantly hindering polio eradication in these states, and it is argued that these actions should be incorporated into an expanded conceptualisation of bioterrorism. Lessons are drawn from the GPEI to augment current understandings of terrorism, counter-terrorism and disease in Africa, with recommendations for future action.

KEYWORDS

Bioterrorism; polio; Africa; global health; terrorism; Nigeria; Pakistan; Afghanistan

Introduction

In an entirely unprecedented turn of events, the field of global health has been thrown to the forefront of the world’s agenda after the outbreak of SARS-CoV-2 in Wuhan, China, spread to become a global pandemic in early 2020. Known as Covid-19, the virus has left few states unscathed, with global cases at the time of writing surpassing 141 million and deaths standing at over three million,¹ but the scope of the devastation goes further than mortality. Economies have been demobilised, health care facilities are overwhelmed, unemployment has spiked, and borders have tightened. It is in these contexts of disease, disruption and fragility that terrorists can thrive.

The African continent is situated within a precarious nexus of conflict, terrorism and disease, yet bioterrorism, as a dangerous combination of the latter two, is a topic that is significantly under-researched in the African context, placing the continent in a vulnerable position for the decade moving forward. Experts at the Council of Europe have suggested that the aftermath of the Covid-19 pandemic may see an increased use of

CONTACT Kayla Arnold  kaylashedleyarnold@gmail.com

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bioweapons by terrorists, after seeing the potential for mass disruption and destruction.² Indeed, there have already been terrorist groups exploiting the situation, as well as threats and reported cases of the Covid-19 virus being spread deliberately.³

These connections between terrorism and epidemics are not new, and similar patterns are found when studying the case of terrorism and polio. The eradication of polio – an event that could be one of the greatest achievements in global health – is proving to be a frustratingly stubborn mirage in the face of rising challenges.

The past decade saw global actors moving closer than ever to celebrating complete eradication, with only two states still classified as polio-endemic – Pakistan and Afghanistan. This made the resurgence of polio in Nigeria in 2016 a massive shock globally, prompting the urgent need for reassessment amid fears of it spreading to other African states.⁴ While Nigeria has since been declared free of wild polio once more and the whole of Africa is thus now officially polio free,⁵ in a globalised world the threat of resurgence still lingers.

Vaccinations are the key to irrevocably eradicating this disease, but this achievement has been hindered by various factors in the three states under study here. These include inability to access areas for immunisation, attacks on vaccinators, health care malpractice, anti-vaccination rhetoric and general conflict.⁶ As terrorism ties closely with many of these situations of instability, this brings into question the possible relationship between terrorism and the undermining of polio eradication efforts.

If the hindrances to polio eradication efforts are not analysed and combatted, it is highly possible that what should be an antiquated disease will again bedevil certain less economically developed states. Conversely, the exploitation of disease crises such as polio and Covid-19, directly or indirectly, may exacerbate the impact of terrorism. Taking a global health perspective on terrorism, this paper will delve into the specific ways in which terrorism directly and indirectly challenges the Global Polio Eradication Initiative (GPEI) with reference to Nigeria, Pakistan and Afghanistan. This paper uses a broadened definition of bioterrorism, going beyond its typical usage to explore the nexus between disease and terrorist activity, focusing on the research question: What is the relationship between terrorism and the global polio eradication efforts? Following this, sub-questions will be interrogated: How does this relationship link to existing understandings of bioterrorism? What are the implications and lessons for bioterrorism preparedness in Africa?

The scope of this paper does not seek to claim that terrorism is the main factor obstructing polio eradication efforts, but instead aims to explore how terrorist activities threaten progress, and how the phenomena witnessed in relation to polio could be relevant to studies of disease and terrorism in Africa. Furthermore, it does not intend to cover the biomedical side of the traditional definition of bioterrorism, wherein viruses are directly created/stolen/chemically manipulated by terrorists for their own purposes. Different viruses vary in their ability to be spread as bioweapons, and even though there certainly is potential for viruses such as polio or Ebola or Covid-19 to be utilised in this manner, that aspect of speculation is left for future research.

Overview of the literature

Health issues are not new to the international relations (IR) agenda, and IR has been well-utilised in providing conceptual and theoretical explanations for many global health

phenomena.⁷ In order to delve into a deeper study of the relationship between terrorism and polio, it is necessary to first briefly survey prior studies covering similar topics and conceptualise relevant definitions, as well as place the discussion within global health-related IR theory.

Shifts in the global health agenda

The epoch of globalisation has brought many transformations to the global system that bring to light the interconnectedness of health issues and outcomes across the globe. Temporal changes in cross-border travel, mass migration and international trade have concurrently increased the threat of transborder disease transmission, giving rise to the shift towards global health governance. In terms of polio, many different explanations for the stagnation of progress in polio eradication have been discussed, with logistics and clinical efficacy regarding the actual vaccinations being beyond the purview of this article. However, the spread has historically been understood through an epidemiological perspective, while the biological, technical and organisational factors that inhibit polio eradication have been well documented and understood in risk assessments for outbreaks. However, the less overt socio-political factors have fallen outside the same systemic analysis.⁸

The growing anti-vaccination movement also needs to be considered as a salient issue on the global health agenda. For the first time, the WHO declared vaccine hesitancy as one of the top ten threats to global health in 2019, noting with concern a range of attitudes from hesitancy to strong anti-vaccination movements.⁹ For example, immunisation efforts were stopped in their tracks in 2003 when officials in Kano, northern Nigeria, refused to allow polio vaccinations to take place due to unfounded allegations that the vaccines were contaminated and would cause HIV/AIDS or sterility.¹⁰ In prominent medical journals such as *The Lancet*, polio is addressed primarily from the standpoint of needing increased production of vaccines and addressing vaccine immunity,¹¹ which fails to address how and why the existing vaccinations are not getting to their targets. It is therefore necessary to explore the role of terrorist groups in potentially contributing to vaccine hesitancy.

Conceptual framework: Fragile states, terrorism, and bioterrorism

The analysis of polio within Africa and the Middle East cannot be discussed without reference to the concept of fragile states, as state fragility is often present within the less economically developed states where the disease is present. Developed states with more robust health systems are far less vulnerable to bioterrorist attacks, which adds to their deterrence factor.¹² However, there is controversy in the academic realm over the conceptualisation of a fragile state. It has been defined in terms of cyclical decline and collapse of a state,¹³ and also as 'a polity that is no longer able or willing to perform the fundamental tasks of a nation-state in the modern world'.¹⁴ This study will utilise the latter, as it is studying states only within one point in time, in relation to when polio is/was present.

Much literature has emphasised the connections between state fragility and the spread of disease such as HIV/AIDS.¹⁵ Scholars such as Peter Tikuisis have also shown that there is a strong connection between weak states and terrorism due to issues of

legitimacy.¹⁶ He explains that when there is an inability of states to retain centralised control, it gives rise to alternate agents of influence, such as the Taliban who control major regions of Afghanistan, and to a lesser extent Pakistan. Further than correlation, it has also been found that the nature of terrorist attacks is deadlier in conflict situations than in non-conflict situations.¹⁷ Robert Rotberg, a prominent author on failed and weak states, supports this as he highlights how conditions of state fragility such as the widespread disorder, anomic behaviour and prevalence of drug and gun trafficking are conducive to the development of terrorist networks.¹⁸ It is on this premise that the framework of state fragility will be included in this paper, as Afghanistan is on high alert, and Pakistan and Nigeria both on alert on the index for state fragility.¹⁹ They are also hotspots for terrorism.

This article uses the common definition of terrorism that has been conceptualised within IR, that is, the use of violence against civilians for political/religious/ideological aims. In addition to this, terrorism is defined as violent actions with the aim of instilling fear among citizens, the goal being achieved when there is appeasement, or retreat of the target group or society.²⁰ While the use of the word 'terrorist' can be considered pejorative, value-laden, and controversial, this article employs this terminology when describing various groups enacting political violence due to their particular method, target, international operation, and psychological intent being characteristic of terrorism.²¹ This framing also aligns with that used in the wider referenced literature, such as the Global Terrorism Index.²²

The concept of bioterrorism combines these definitions with biowarfare, where biological agents are intentionally disseminated for the harm of others.²³ Whereas most of the literature utilises this more limited definition of bioterrorism, the study by Melissa Hersch and Michael Hopmeier is one of the few that allows for a broader conceptualisation, such as one that includes the withholding of vaccines and exploiting biological agents.²⁴ Rose Bernard *et al* contribute to understandings of such indirect bioterrorism by pointing to the role of disinformation in producing the effects of biological terrorism, termed 'cyber biowarfare'.²⁵ Moreover, Margaret Kosal highlights that the historical approaches to bioterrorism deterrence, which focused on pathogen security and defensive control of epidemics, have largely been translated from passive measures used in nuclear deterrence, and points to the need for more active bioterrorism deterrence strategies to deal with disease outbreaks such as polio and Ebola.²⁶ Regarding epidemics, bioterrorism has primarily been studied in relation to diseases like Ebola, anthrax and smallpox,²⁷ but there is still a distinct lack of research about bioterrorism in connection to polio, the indirect forms of bioterrorism and broader studies of bioterrorism in Africa.

There has been a considerable amount of research done on the impact of conflict on polio eradication efforts, for example in areas such as Somalia, Southern Sudan and Afghanistan.²⁸ These have looked in particular at the influence of civil wars in increasing the magnitude of vulnerable children, mass displacement and in disrupting the final step of getting the polio vaccines to where they are desperately required. The forced mobility of displaced populations was often found to have been detrimental to routine polio immunisation efforts. While there has been significant research done into the impact of conflict on the prevailing state of polio,²⁹ terrorism, as a branch of conflict, can therefore be analysed in a similar way to uncover its influence in possibly destabilising polio eradication.

Methodology

While there is some correlation between conflict, terrorism and polio,³⁰ a gap remains as to how exactly terrorism connects to the current spread of polio in Afghanistan and Pakistan, and what lessons can be drawn from these experiences for Africa. This paper utilises a case study design focusing on Afghanistan, Pakistan and Nigeria, rooted in an explanatory approach due to the fact that the cases will not be unpacked in an in-depth manner. Instead, this approach is chosen so as to allow for the identification of common and diverse trends, which will help solidify and deepen the recommendations that follow. These cases were chosen as they are the three states in which wild poliovirus has most recently been (or continues to be) endemic, and while Nigeria was declared free from wild poliovirus in early 2020, its experience is still highly relevant and useful for an African perspective. The nature of the study is qualitative, exploratory and theory-building, relying on desktop research by means of journal articles and news releases to contribute to the limited discussion on bioterrorism in Africa.

Overview of the poliovirus

Many epidemics and diseases have been considered severe health threats yet have not been formally declared as global health crises by the WHO. The case of polio, however, meets multiple criteria for a global health emergency, as the disease both physically crosses national boundaries and harbours the threat of a global resurgence. Given that 'the global in global health refers to the scope of problems, not their location',³¹ the WHO has kept polio on the international health emergency list, alongside diseases such as Ebola.³² By hailing polio as a Public Health Emergency of International Concern (PHEIC) in 2014, the WHO initially aimed to catalyse political concern and advocacy around the issue as well as to invoke the WHO's normative power through recommendations to prevent further polio transmission.³³ The framing is considered to be significant in that it shapes public perception of the disease and asserts the priorities of global health actors. Communicable diseases such as HIV/AIDS and pandemics have historically been securitised and framed as threats to the national security of developed states, resulting in their superior prioritisation on the international agenda. As polio has maintained its place as a PHEIC, its importance within global health is notable.

A brief history of polio eradication efforts hitherto

In order to address the continuing threat of polio, the Global Polio Eradication Initiative was launched in 1988 by the WHO, at a time when there were over 350 000 cases of polio in over 125 states worldwide.³⁴ With the collaboration of the WHO, the United Nations Children's Fund (UNICEF), Rotary International, the Bill and Melinda Gates Foundation and the US Centers for Disease Control and Prevention (CDC), this initiative is the largest private-public partnership in public health.³⁵ It has been an extraordinarily successful campaign, boasting an over 99% decline in wild polio cases since 1988 due to the massive integrated eradication efforts.³⁶

There has been consistent improvement in vaccine production and efficacy which has decreased technical obstacles, yet little improvement is seen on the ground in those

states still reporting cases. Poor service delivery has been cited to be one of the reasons that the effect of the vaccine has been limited in those states.³⁷ Deeply concerning is the fact of the increase in wild poliovirus cases globally since 2018, especially in Afghanistan, and in 2011, Pakistan reported that polio was at its highest incidence in a decade.³⁸

The eradication of polio, and terrorism

The following sections will present evidence and analysis on the different ways in which terrorism is connected to the polio eradication campaign, specifically through targeted violence and anti-vaccination rhetoric, and how these experiences are relevant to broader understandings of terrorism and disease in Africa.

State fragility and polio

Despite the progress made in vaccine production and roll-out, conditions of conflict are affecting the success of vaccination efforts, which points to the need for initiatives to be restructured for conflict settings.³⁹ There are various reasons that help explain how conflict settings increase the risk for disease outbreaks. These regions tend to have poor living conditions, overcrowding, unsanitary conditions and a lack of available nutrition, which all collaborate in creating a favourable milieu for the spreading of disease. Particularly disruptive, armed conflict often destroys health care facilities, as seen in Pakistan where the health sector has been devastated by conflict.⁴⁰

Armed conflict and generalised violence can also result in large movements of populations and the creation of internally displaced persons (IDPs). IDPs are particularly at risk for having low rates of immunisation among the children, which was seen in the high-conflict areas of the Federally Administered Tribal Areas (FATA) along the Afghanistan–Pakistan border. The relocation of IDPs also carries the added risk of the disease being reintroduced into the new area of settlement.⁴¹ Low immunisation not only affects the combatting of existing strands of polio but can lead to outbreaks of vaccine-derived polio. When vaccine coverage is low, in rare cases the weakened-vaccine virus that is used in immunisation can begin to spread and mutate into a stronger, more virulent strain that can also result in paralysis.⁴² This makes it integral for volunteers to be able to reach the majority of people in a community and at a young age.

Numerous factors can be blamed for retarding the polio eradication initiative to varying extents, such as religious misinterpretations, lack of access to health care, lack of awareness, and inefficient vaccines.⁴³ Low literacy rates in conflict areas also contribute to inhibiting the reach of polio awareness campaigns.⁴⁴ Geographic context also comes into play, with the shared polio reservoir being along the Afghanistan–Pakistan border, which means that there is widespread peripatetic movement which transports the virus. Forced migration across this border and other regions makes it very difficult to track children for follow-up vaccinations, routine or national immunisation days, leaving children only partially covered and ultimately unprotected.⁴⁵ As polio does not always exhibit symptoms, this movement makes the virus even more difficult to trace and contain.

A lack of legitimacy is an important characteristic of a fragile state and one which can be connected to weak governmental informational authority in the case of polio

outbreaks.⁴⁶ The rise in terrorism has been salient in eroding that authority further through their dissemination of anti-vaccination discourses that replace medical and governmental information regarding the safety and necessity of vaccination, to be discussed further below. This manifestation of state fragility helps explain why traditional top-down channels of knowledge spreading can struggle to take root in states such as Afghanistan and Pakistan, where the Taliban exerts significant influence. In Africa, the social and economic toll of disease outbreaks is another factor that may affect terrorist activity, as many more people are thrust into poverty and desperation which increases vulnerability to terrorist recruitment and exploitation.⁴⁷

It is possible that there could be spurious causality within analyses of the interconnections between state fragility and disease, as many of the conditions giving rise to terrorism could overlap with those giving rise to higher disease outbreaks, making it less clear which factors are more responsible. In order to ascertain whether terrorist activities in states are particularly more connected to polio, it needs to be investigated whether states experiencing Islamist insurgencies exhibit a higher number of polio cases than states without Islamist insurgencies. Furthermore, as counterinsurgency from the West has been linked to the exacerbation of conditions that lead to terrorist activity,⁴⁸ it could be expected that, in the wake of significant counterinsurgency activities, terrorism and its attendant effects on polio cases would be worse. When looking at recent data that assesses the quantitative correlation between terrorist conflict and polio cases over time, results are consistent with the argument that terrorism significantly contributes to recent polio outbreaks. While Kennedy *et al* argue that terrorism has not held a significant positive relationship with polio cases throughout all of the history of polio,⁴⁹ it has indeed been strongly connected with outbreaks in recent years. When external explanatory factors were removed, the evidence challenged the notion that general armed conflict was perpetuating polio outbreaks. This supports the claim that terrorism negatively affects the GPEI, but qualitative analysis is required to analyse *how*.

Polio in the face of violence: Conflict and terrorism

Conflict has often been seen to have prolonged or revived outbreaks of polio worldwide. For example, the aftermath of the Gulf War of 1991 saw an increase in polio cases, and this new polio outbreak was attributed, as late as 1999, to the lingering social and economic effects of the Gulf War.⁵⁰ There have been well over 150 major conflicts since the Second World War, and they are increasingly targeting civilians, resulting in mass migration and displaced populations, with children often being most adversely effected.⁵¹ This is clearly seen in the disparity between northern and southern Afghanistan, where the conflict-free north has had improvement in vaccination coverage relative to the conflict-ridden south.⁵² Furthermore, in conflict situations, it is even more necessary to get vaccines to children due to the knock-on effects from prevalent infectious diseases such as influenza, chicken pox, or measles. This refers to how these diseases can cause reduced ability to absorb nutrients, thus resulting in nutritional deficiencies and compromised immune systems, ultimately making it more difficult to stave off new diseases such as polio.⁵³ In this complex situation, it is vital that vaccines are delivered successfully.

However, polio has been successfully eradicated from other states that were in conflict settings, so what makes the remaining polio endemic states different? When looking at the

health impacts of conflict and challenges in delivering health services, the outcomes tend to vary according to the type of conflict situation. One can distinguish between primarily inter-state conflict between two or more states, and primarily intra-state conflict such as civil war, the latter of which has made up the majority of conflict around the globe in recent decades.⁵⁴ Lastly, conflicts that are primarily internal but without the involvement (or even existence) of an official central government, instead involving multiple factions and non-state groups, present the most severe challenge to health service delivery.⁵⁵ Conflict in the polio endemic states could be seen to fall within this latter category.

It is clear that conflict-ridden factors remain the primary drivers of terrorism, with over 95% of deaths from terrorism occurring in states already in conflict,⁵⁶ and terrorist actions exacerbating the aforementioned conditions in conflict settings, particularly through the use of targeted violence. Vaccination efforts have been further hindered by terrorist violence, with aid workers and volunteers being targeted, causing disruption to immunisation processes. Across Afghanistan and Pakistan, terrorists have kidnapped, attacked and assassinated many vaccinators, volunteers and their armed escorts. In fact, in 2014 it was reported that polio-related murders enacted by terrorists accounted for more deaths than polio itself.⁵⁷ In one incident in Karachi and Peshawar, Pakistan, six volunteers were shot dead while doing home visits on an immunisation campaign, resulting in a temporary shut-down of the immunisation campaign.⁵⁸ This increased vulnerability of immunisation workers has led to increased security measures being put in place; in the case of Pakistan, this event was followed by a nationwide suspension of the polio vaccination campaign. These violent actions could possibly show an increase in the politicisation of the eradication of polio, as terrorists realise the benefits from attaching themselves to a well-publicised situation. As a result, polio workers' willingness and ability to work in terrorist-controlled areas is significantly reduced.⁵⁹ Not only have terrorists around the Afghanistan–Pakistan border committed violent acts against local communities, but they have also targeted infrastructure – such as water treatment plants – the destruction of which indirectly contributes to polio transmission. Lack of clean water supply results in fecal-oral viruses such as polio being more easily spread and can also cause diarrhoeal diseases that reduce absorption and efficacy of the polio vaccine.⁶⁰

The experience of polio, terrorism and state fragility in Nigeria differs slightly to that of Pakistan and Afghanistan. Despite issues of rampant corruption, national disunity and internal disputes, Nigeria cannot be said to be experiencing the same extent of conflict akin to Afghanistan or Pakistan. However, these polio hot spots mirror each other in their volatility and susceptibility to terrorism. In Nigeria, the terrorist group Boko Haram has devastated large areas of northern Nigeria, causing thousands of deaths, destruction of property, widespread internal displacement and considerable financial costs. Furthermore, their violence has resulted in the destruction of the public health care systems in these areas, the effects of which have been well-documented in terms of HIV/AIDS.⁶¹ While it was found that incidence rates of HIV infection did not correlate to increased terrorist conflict, the same cannot be said for polio. On the contrary, the north-eastern states where Boko Haram operates have also been the areas in which it has been most difficult to control the spread of polio.⁶² Similar to the pattern in Pakistan and Afghanistan, the terrorist group has directly targeted polio workers in northern Nigeria.⁶³ In one case in 2017, two gunmen targeted a polio vaccination clinic and killed ten health workers, resulting in the suspension of vaccination campaigns due to widespread fear among the locals.⁶⁴

While the 2016 resurgence of polio in Nigeria underlined the state's vulnerability to disease, upon the time of writing Nigeria has just celebrated four years without reports of new cases.⁶⁵ While this is indeed significant progress, the volatility of resurgences and the role of terrorism and conflict in spreading polio serve as reminders not to allow complacency in the success, as it is a fragile achievement that requires surveillance and maintenance to sustain. It is interesting to note that in comparison to the Afghan and Pakistani Taliban, Nigeria has seen the greatest decline in terrorist action. This is largely linked to Boko Haram's decline in attacks over the past several years which saw a decrease of 89% since 2014, with 85% of their overall attacks in Nigeria.⁶⁶ This decline is overwhelmingly due to successful efforts by the Multinational Joint Task Force, in conjunction with the Nigerian military. Despite this decline, Boko Haram remains the deadliest terrorist group in Sub-Saharan Africa, and fourth deadliest worldwide. Furthermore, terrorist attacks in Nigeria attributed to 'Fulani extremists' rose by 75% in 2019, as part of the ongoing conflicts between Nigerian pastoralists and various farming communities.⁶⁷

Anti-vaccination movements

Vaccine bans and the spread of anti-vaccination messages are further ways in which different levels of extremists have gained control over humanitarian efforts to eradicate polio. The WHO named vaccine hesitancy among the top ten threats to global health in 2019, with the global rise in what is known as the 'anti-vaxxers' pushing rhetoric against vaccinating children.⁶⁸ In particular, there has been widespread dissemination of misinformation claiming that the measles, mumps and rubella (MMR) vaccines cause autism. It has long been proven that these fears are medically unfounded, yet the growth of this movement is significant, with substantial consequences for health.⁶⁹ However, a lesser known manifestation of this anti-vaccination trend is that of terrorists spreading strong anti-vaccination discourses in Africa and the Middle East. This is seen in the example of Boko Haram spreading disinformation and conspiracies, such as claiming that vaccinations are a Western scheme to render children infertile.⁷⁰ The rise in Western vaccine hesitancy has been facilitated largely by online and social media channels,⁷¹ with the growth of the internet often facilitating a cesspool of fast-spreading panic. However, terrorist anti-vaccination messages have been spread through different methods, and cannot necessarily be addressed through increasing regulation of search engines and social media organisations, as recommended elsewhere.⁷²

In the case of polio, these anti-vaccination rumours and discourses have gone further than creating online scepticism and individual choices not to vaccinate, but have been used to legitimise organised vaccine boycotts and targeted violence against polio aid workers. The first major altercation between Islamist leaders (albeit non-violent) and the polio eradication mission can be traced back to vaccination bans in northern Nigeria in 2003. Pushing the message that vaccinations were a Western conspiracy to render Muslims infertile, this ban lasted a year and had massive ramifications for polio eradication. It resulted in a polio outbreak that spread to over twenty states in Nigeria, which at the time was 80% of cases worldwide, and set the eradication campaign back by over \$500 million.⁷³ In terrorist-controlled areas in Pakistan, Afghanistan, Nigeria and Somalia, fatwas have been issued by extremists that ban the use of particular vaccines.⁷⁴ These bans drastically increase the risks of transmission by reducing herd immunity and

community-wide resilience and pose a serious threat to trans-border security; in short, they comprise a global health emergency.

Afghanistan has also experienced the impact of anti-vaccination efforts in full force. In 2018, 1.2 million children were deprived of polio vaccinations due to the Islamic State (ISIS) and the Taliban. The southern provinces and hard-to-reach areas in the south, south-east and eastern Afghanistan are most affected as they are the areas in which the Taliban holds significant control. In these areas of influence, the Afghan Taliban imposed a ban on the activities of the WHO and the International Committee of the Red Cross, including house-to-house vaccinations.⁷⁵ As the optimal time to reach children for vaccinations is at a very young age, this has had fatal consequences.⁷⁶ Earlier in April 2019, collaboration between local religious leaders and elders with the local health officials managed to negotiate a conditional agreement with the Taliban that is currently allowing children under Taliban-controlled areas to be vaccinated, as long as it is not at home and takes place at a mosque or public place of gathering.⁷⁷

One of the justifications for the ban given by the Taliban was the 'suspicious' actions of vaccination workers, who are seen to be marking the doors of houses that they have visited where residents are not home, for the workers to return at a later date. This has been considered by the Taliban to be evidence of vaccinators being spies, either for the government or for foreign forces. Other rumours pushed by the Taliban are that vaccinations are Western plots to sterilise Muslim children, or that swine are used in preparation of the vaccine, which contravenes Muslim religious belief.⁷⁸ Messages like these can decrease the willingness of parents to allow their children to be vaccinated. In fact, government records from Pakistan reported that more than 40% of wild poliovirus cases in 2014 were due to immunisation refusal from households.⁷⁹ This could also be linked to a broader indigenous resistance to colonial immunisation, and the prevalence of traditional beliefs. Within this belief, medical and health systems can be seen as a form of 'therapeutic tyranny' through which coercion, regulation and oppression can take place.⁸⁰ The area along the Pakistani-Afghan border where polio is mainly endemic is also home to traditional, conservative religious tribes that are strongly influenced by the negative attitudes towards vaccinations from their local religious leaders and scholars. Similar sentiments have circulated in Africa, where Islamic leaders in northern Nigeria have also spread rumours that polio vaccines were used to sterilise Muslim girls. Acknowledging the need to address the religious aspect of vaccine hesitancy, in 2003 Bill Gates visited the Nigerian city of Sokoto to address religious and traditional leaders, with the Sultan of Sokoto as an important ally. He was successful in winning commitments from both the sultan and other leaders that they would take a more active and collaborative role in promoting polio immunisation.⁸¹ It must be noted that it would be a generalisation to say that all Islamic religious leaders oppose vaccinations; there is evidence of influential Pakistani leaders issuing fatwas which encouraged families to immunise their children against various diseases.⁸²

The third of the UN's Sustainable Development Goals, which is focused on improving health and wellbeing, includes a requirement that national governments improve routine immunisation coverage of citizens. It is difficult to accurately discern coverage in these three states under study, due to lack of data, however, overall Pakistan has low and unequal immunisation coverage, with decreasing coverage in both Pakistan and Afghanistan since 2006; this correlates with the rising number of polio cases.⁸³ It is clear that

greater analysis and care needs to be taken in how to address and change these challenges that are inhibiting mass immunisation. On the one hand, much emphasis could be placed on education: actions could include increasing health and polio awareness, collaborating with local community and religious leaders to spread vaccination messages and refuting misinformation that is falsely circulated. As maternal illiteracy and lack of accurate knowledge of the vaccinations has been connected to low immunisation participation rates, improving women's literacy and education would be one important step in diluting the effects of terrorist propaganda. Another option could be to increase the role of the government in enforcing vaccinations, although this is a less desirable path. This tactic was used in 2014 by the Khyber Pakhtunkhwa government who issued arrest warrants for anyone who refused the delivery of the polio vaccine.⁸⁴ Government involvement in making polio vaccinations part of the law have also been used through withholding birth certificates until children are vaccinated.⁸⁵

Studies that note terrorism as a threat to polio eradication tend to only view insurgency as a problem in the same way that conflict is a problem, in causing forced migration and disruption of health care services, for instance. Those studies fail to emphasise how terrorism can be seen to be deliberately undermining polio eradication. As discussed in various definitions of terrorism, the generation of fear is an essential tactic for these organisations. In Pakistan, there has been widespread panic in reaction to unfounded rumours about side-effects of the polio vaccination, with the situation being propagandised through the circulation of anti-vaccination videos, credited to the Taliban. Misinformation, coupled with long-standing fears in the militant-held rural areas, contributed to triggering a crowd of five hundred people to set a local health centre alight in anger, and health care facilities were flooded with thousands of parents admitting their children under worries of them being poisoned.⁸⁶ The impact of this panic is likely to exacerbate outbreak situations, both on a local and international level.

The role of misinformation in the spread of disease is certainly not unique to polio, and the perpetuation of inaccurate information, myths, conspiracy theories and fake news has significantly characterised the Covid-19 pandemic, particularly in Africa. Boko Haram has already adapted to the widespread disruption that disease brings by harnessing Covid-19 for its own political aims, with the terrorist group being once again involved in the spread of misinformation. In April 2020, Boko Haram faction leader Abubakar Shekau claimed that the international measures being promoted to curb the Covid-19 virus were part of a war on Islam. He asserted that Muslims are immune to the virus, and that measures such as social distancing, promotion of water drinking during the fast and suspension of pilgrimages are attempts by evil forces to suppress Islam.⁸⁷ Other terrorist groups have issued similar sentiments, with ISIS deeming Covid-19 as a punishment for 'Crusader nations'.⁸⁸ This fear mongering and 'us vs them' mentality, coupled with the alleged Islamic immunity to the virus, could have profound implications for the willingness of Muslim populations to receive a Covid-19 vaccine.

Terrorist attacks on polio as backlash to western hostility

When understood within the context of geopolitical rivalries and interactions between international actors, however, the increased terrorist insurgency and the resistance among Muslim populations to vaccination efforts may be, in part, a response to

Western actions in the Middle East and Africa. Indeed, many have argued that intensive drone strikes from the US, such as those in Somalia, Afghanistan, and Pakistan, have served to increase the potential of radicalisation and terror attacks.⁸⁹ In Afghanistan and Pakistan specifically, the high number of drone attacks between 2010 and 2014 contributed to rising suspicions that vaccination workers were working as undercover surveillance to mark targets for air strikes.⁹⁰ These suspicions sometimes resulted in vaccination bans by local Muslim authorities, such as that of the Pakistani Taliban in North Waziristan in 2012, and are thought to be somewhat responsible for the resurgence of polio cases in Pakistan.⁹¹

Viewed over time, the variation in the level of resistance from insurgent groups to vaccination campaigns is also instructive. If insurgents were inherently opposed to polio eradication efforts, based on their theological belief system, it should stand to reason that their hostility towards polio campaigns would have been consistent over time. However, when they were in power in Afghanistan between 1995 and 2001, the Taliban officially supported the Global Polio Eradication Initiative and even issued fatwas to support their promotion.⁹² This means that targeted attacks and bans either defy these earlier fatwas, or are a result of the actions of a few insurgents with differing ideas, or that new circumstances have resulted in the changing of tactics. The increased targeting of polio workers and vaccination campaigns throughout the 2010s indicates the latter, it is argued here. The targeting of the GPEI appears to have become a political tool, a tactic to generate attention towards the insurgents' cause and force concessions from their opponents. As terrorist attacks on polio workers and clinics have increased in number in the period that US counterinsurgency operations have increased, it appears that terrorists may be increasingly hostile in their response, using the polio campaign as a proxy platform to fight back.⁹³

Furthermore, the increased terrorist enmity towards the West and high levels of suspicion regarding espionage concealed within the GPEI over recent years can be interpreted as brutal backlash in the aftermath of the search for Saudi terrorist Osama Bin Laden, a controversial event which has significantly tarnished the reputation of Western humanitarian aid. Under the guise of a fake hepatitis vaccination programme, the US Central Intelligence Agency (CIA) embarked upon a mission to collect DNA samples from family members, prior to his assassination in 2011. This spurred significant distrust, not without substance, from the local people regarding the public health sector which has persisted in current times.⁹⁴ Popular uprisings against vaccinations and vaccine bans followed, and are more than just a threat to health as they contribute to a vicious cycle of recruitment. When the West is painted as having the ulterior motives of sterilising children and killing through drone attacks, this results in further radicalisation and recruitment into terrorist networks.⁹⁵ This is therefore an important lesson for the West regarding current and future interventions in these states, when understanding vaccine hesitancy as backlash to biopolitical control rather than due to cultural or social beliefs.

When applied to Africa, similar situations could take root which may undermine future health strategies continent-wide. US attacks on Somalia have been blamed for killing numerous citizens and increasing anti-American sentiment,⁹⁶ as seen when Somali rebels proclaimed revenge in response to the killing of a high-profile al-Qaeda suspect in 2009.⁹⁷ During the Covid-19 pandemic, anti-West sentiments have emerged in varying degrees, for example following a scandal where two French doctors suggested

that a vaccine for the virus be tested in Africa.⁹⁸ Perceived 'unacceptable interference' prompted Burundi to expel the WHO from the state,⁹⁹ and many suspicions and conspiracy theories have circulated regarding Bill Gates and the Covid-19 vaccines.¹⁰⁰ Negative Western interference coupled with the promulgation of anti-vaccination rhetoric could substantially affect future global health efforts in Africa.

Expanding the conceptualisation of bioterrorism

As seen from the case of polio, terrorists can thrive off situations of disease. Epidemics and pandemics can provide the opportunity to exploit the uncertainty and disruption to further break social cohesion, disseminate fear, fuel conflict and drive radicalism.

While connections between fragile states and polio transmission are valid, this article argues that there are further connections to be drawn. Specifically, the article proposes analysing polio within the theory of bioterrorism.

Bioterrorism can refer to the deliberate release and dissemination of agents that can cause one or more diseases,¹⁰¹ but as argued earlier in this article, an expanded definition would also refer to attacks and purposeful actions that result in the further dissemination of a disease, even if indirectly. It is within this indirect form of bioterrorism that it can be argued that the actions of the Taliban in Afghanistan and Pakistan, and Boko Haram in Nigeria are forms of bioterrorism. Bernard *et al* argue along similar lines, noting that disinformation health campaigns can produce the same consequences as biological terrorism, and argue for the inclusion of these indirect tactics in discussions of biological warfare.¹⁰² This framing is important, as it distinguishes the negative effects of disease that are unintended by-products of general terrorist disruption from the deliberate and calculated attacks on efforts to reduce disease. This distinction is significant for policy decisions regarding how the problems are addressed, as seen in how drastically Ebola prevention development was scaled up when the disease became securitised through the lens of biodefence.¹⁰³

Terrorist actions that cut across health efforts to combat a disease outbreak could prove more deadly over time than the heavily media-covered suicide bombings and isolated attacks, and could, in the event of disease resurgence, result in the death of millions.¹⁰⁴ Spreading of viruses would not only play into terrorist aims of inflicting mass violence, but would likely foster deep fear and panic within societies, making it an effective future strategy that circumvents conventional warfare tactics.

Moving closer to a polio-free world: Recommendations

The emergence of new understandings about the spread of polio and failings in eradication call for the revisiting of policy and eradication approaches. Based on the earlier analysis, a few brief recommendations will be made for both the counter-terrorism and health aspects, as well as prompting some future questions that must be addressed in order to avoid a reversal of polio eradication gains.

As overwhelmingly illustrated, direct and indirect terrorist acts are to blame for much of the continuation of polio's existence, and terrorism must be addressed more seriously as an underlying factor to avoid humanitarian efforts perpetually being undermined. Pakistan has been critiqued for not doing enough against terrorism; in fact, it has been

accused of encouraging it through a long history of providing a safe haven to terrorist groups, as well as providing military and advisory support.¹⁰⁵ Pakistan's Inter-Services Intelligence provided covert support for the Taliban's leader in Afghanistan, and Pakistan was one of three states (with Saudi Arabia and the United Arab Emirates) to recognise the Taliban's violent rule as legitimate when it gained control in Kabul in 1996. While support has decreased over the past decades, there is evidence that some organs of the Pakistani government continue to support the Taliban to the current day.¹⁰⁶ Therefore, much power rests in the hands of Pakistan to move past superficial anti-terrorist rhetoric towards committed anti-terrorist action, both within its own territory and in Afghanistan. Cross-border problems such as the spreading of disease call not only for extensive coordination in the deployment of resources but also for better coordination efforts to combat terrorism. Currently, Afghanistan and Pakistan do exhibit strong collaboration and coordination regarding polio eradication efforts, particularly focused on the high-risk mobile populations that cross their shared border.¹⁰⁷ Bilateral coordination on security and improved surveillance in rural areas, however, leaves much to be improved.

The increasing attacks by terrorists on health care facilities, as outlined above, highlights the issue of how health care systems should adapt and respond. In areas where health needs are underserved, many of which are in fragile settings, specially tailored policies are required. This could include increased immunisation flexibility and the reallocation of resources away from health care hotspots to mobile health units. In response to attitudes of distrust against Western doctors and volunteers, the use of community vaccinators could help increase acceptance and trust among the citizens. Alongside improving health policy and facilities, there needs to be increased risk analysis of terrorism and its effects on global health, with appropriate increases in funding for counter-terrorism efforts.

Bioterrorism: Further lessons and recommendations for Africa

While the number of deaths from terrorism is falling globally, in 2019, sub-Saharan Africa overtook the Middle East and North Africa (MENA) as the region with the second-highest number of deaths from terrorism, with the primary driver being the rise in Nigerian terrorist activity.¹⁰⁸ In sub-Saharan Africa in 2019, Nigeria, Somalia, the Democratic Republic of the Congo, Mali and the Central African Republic were the states most affected by terrorism.¹⁰⁹ As epidemics and pandemics become more common,¹¹⁰ it can be expected that extremist groups may increasingly exploit these crises to increase recruitment, violence and disruption. It is therefore imperative that Africa prepares itself for this deadly overlap. While many African countries have significant experience in handling a variety of highly infectious diseases,¹¹¹ bioterrorism, both direct and indirect in nature, poses a risk for states with already fragile health systems, where the spread of disease would likely carry a more devastating impact. The case study of polio, above, has shown that the manipulation of disease for terrorist aims can and has taken place, with severe consequences.

The different ways that terrorists exploit disease can be categorised as either ideological or operational. Ideologically, Africa deals with a double threat when it comes to health and the spread of diseases due to African states' variable trust in vaccinations and science. As witnessed in the case of polio, if terrorists use anti-vaccination rhetoric as a deliberate

tactic in African states, this will exacerbate the already limited acceptance of vaccines. According to the 2018 Wellcome Global Monitor, more than half the people surveyed in Southern Africa had not heard of the term 'vaccine' before (in their local language);¹¹² this was the highest proportion for any region in the world. In some sub-Saharan African states, belief in the effectiveness of vaccines is notably low,¹¹³ but this may be affected by the fact that it has been so difficult to roll out enough vaccines to reach the required amount for herd immunity, leading people to believe that the vaccines are not working. Terrorists interfering in the delivery of vaccines therefore stand to perpetuate this problem.

The fear and confusion that arise during crises such as pandemics and epidemics create an atmosphere conducive to the spread of conspiracy theories and fake news. This has been seen in the surge of fake news, misinformation and disinformation during the Covid-19 pandemic.¹¹⁴ In the hands of terrorists, social media provides a cheap resource to mobilise, recruit and radicalise supporters as well as spread fear and propaganda to the general public. Groups such as ISIS have already been found to use social media platforms like Telegram, Twitter and online newsletters to organise supporters and attacks in Africa, and these online tactics have grown with the increase in internet access and literacy.¹¹⁵ Social media, fake news and misinformation need to be tackled on a societal level through multi-stakeholder collaboration. Social media platforms have already been investing in Artificial Intelligence-based programmes to counter terrorist propaganda,¹¹⁶ but legal regulations also need to be tightened in order to limit terrorists' strategic use of the internet. More effort needs to be put into building relationships with traditional and religious authorities in African communities to counter misinformation and collaborate in public health communication, as well as engaging with the role of religion and religious discourse in counter-terrorism efforts.¹¹⁷

On the operational side, terrorists in Africa can use disease to disrupt on a variety of fronts, such as the aforementioned targeted violence and attacks on health care facilities and health workers. In addition to the severe threats of violence and destruction, terrorism may also thrive in crises of disease due to states' redirection of funds and military focus. Many states in Africa have already had to redirect their militaries to deal with the Covid-19 pandemic, joining efforts to enforce lockdown regulations and ensure stability.¹¹⁸ Without due recognition of the likelihood of future epidemics and commensurate funding, governments may compromise their already over-stretched militaries and weaken counter-terrorism efforts. New counter-terrorism efforts must include training security forces in the modified tactics of terrorists, including boosting protection for health care workers and infrastructure.¹¹⁹

Moreover, a humanitarian vacuum has been left behind as aid organisations and non-governmental organisations have been forced to shift priorities to handle the pandemic. At the same time, they face potential funding cuts from donors as the global economy slows due to the many COVID-19 lockdowns. These developments provide opportunistic terrorists scope for consolidating their own influence. New vulnerabilities have also been uncovered during the Covid-19 pandemic that could increase the platforms available for terrorist attacks. Around the world, the past few months have seen increased cyber-attacks on health institutions and hospitals,¹²⁰ highlighting yet another way that pandemics can be exploited.

Conclusion

The perennial existence of polio has often been overshadowed by other diseases like Ebola and HIV/AIDS. Perhaps this could be considered as good news, highlighting the massive successes of the Global Polio Eradication Initiative in almost completely eradicating the disease worldwide. However, the relatively recent resurgence of polio in Nigeria in 2016 (now controlled), and the continued existence of polio in Afghanistan and Pakistan represent a challenge yet to be conquered. As polio is incurable, yet preventable, vaccinations are the key to complete eradication, yet the Global Polio Eradication Initiative has faced numerous obstacles in their mass vaccination campaign. Various reasons have been offered in attempts to explain why polio eradication efforts are being inhibited, including vaccine specifics, conflict, lack of governance and inefficient vaccination delivery. Noticing that the three states in which polio has plagued most recently are also within the top five states impacted by terrorist attacks,¹²¹ this paper interrogated the relationship between terrorism and polio eradication efforts, considering how this relationship links to existing understandings of bioterrorism and the lessons that can be drawn for Africa.

Through a broad exploration of the different ways in which polio and terrorism have intersected across Nigeria, Pakistan and Afghanistan, this paper demonstrates how terrorist groups have actively exploited polio for their own gain, and how these actions can be viewed as an indirect form of bioterrorism. As the frequency of epidemics and pandemics are predicted to rise, the case of polio's eradication – and the challenges posed by terrorism to that effort – is useful to prepare for the future of terrorism and disease on the African continent. Indeed, similar patterns have already been noted during the Covid-19 pandemic.

Major areas of prior study were discussed in relation to current global health debates, with particular emphasis on how often health issues are overwhelmingly addressed through an epidemiological lens. In the case of polio, this has left a gaping lack of information explicating the qualitative relationships between conflict, terrorism and disease.

While previous scholars have studied diseases in the context of conflict and state fragility, this paper suggests that a more nuanced understanding is necessary, taking state fragility a step further towards its connections to terrorism. Other previous studies have shown a quantitative correlation between areas of terrorism and a rise in polio, and this article set out to interrogate *how* they are connected, presenting discussion in the major categories of state fragility and polio, terrorist violence and polio, anti-vaccination movements, and anti-Western sentiment.

Afghanistan, Pakistan and Nigeria were all highlighted as hotspots for terrorism, with the Taliban plaguing the former two states and Boko Haram targeting the latter. The Taliban and Boko Haram were both shown to have increasingly targeted vaccination facilities and workers, through violent attacks, kidnappings and murder. These violent acts often led to suspensions of the anti-vaccination campaigns and declining willingness on the part of health care workers to work in these vulnerable situations. Anti-vaccination movements as propagated by terrorist organisations were highlighted as also playing a significant role in stagnating polio eradication efforts. The role of drones and the fake vaccination campaign set up by the US to locate Osama Bin Laden were discussed in relation to how they may have fuelled this terrorist response.

The major unique contribution of this paper to global health is through its application of bioterror to polio, as while most debates on bioterrorism cover direct transmission of

biological agents, the terrorist groups' utility of polio as a political tactic to achieve their aims can place it as an indirect form of bioterrorism. This research contributes to a more holistic understanding of terrorism in Africa which considers the continent's unique nexus of conflict, terrorism and disease.

As bioterrorism is an under-researched topic in Africa, and with the Covid-19 pandemic making it more relevant than ever, the final section drew on the experience of the Global Polio Eradication Initiative to contribute to broader understandings of disease and terrorism on the continent. Here, terrorism's roles in vaccine hesitancy, the spreading of misinformation and targeting of health facilities, coupled with other issues that pandemics can bring such as a humanitarian vacuum and the weakening of military counter-terrorism efforts, highlight a future that Africa needs to prepare for. The politicisation of disease impacts both health and counter-terrorism efforts in Africa in terms of preparedness, protection and response, making it integral that disease is accounted for within terrorism studies and interventions.

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Note on contributor

Kayla Arnold is a Master of Science candidate in Global Health and Development at University College London, United Kingdom. She has a BA(Hons) degree in International Studies (cum laude) from the University of Stellenbosch, South Africa, and previously worked for the Institute for Justice and Reconciliation in Cape Town. Her research interests lie in the intersections of conflict, humanitarian crises, gender, and global health, particularly focused on the African continent.