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Empowering Namibia's Fight against Malaria: Drawing Inspiration from China's Remarkable Malaria Elimination Journey

Ndapewa O. Johannes^{1*}

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ABSTRACT

Malaria is a debilitating parasitic disease that has been prevalent in various parts of the world, including China and Namibia. China's successful elimination of Malaria offers valuable lessons for Namibia in its ongoing efforts to control the parasitic disease. This paper explores the historical context of Malaria in Namibia and its fight towards elimination of malaria, as well as China, the strategies employed by the Chinese government in the elimination of malaria, and the key lessons that Namibia can learn from China's success. The discussion highlights the importance of political commitment, multisector collaboration, tailoring control strategies to local contexts, adopting a comprehensive approach, and emphasizing health education and community mobilization. By adopting these lessons and fostering a robust national strategy, engaging diverse stakeholders, and ensuring active community involvement, Namibia can work towards achieving eliminating Malaria, improving the public health system, and promoting sustainable health development.

INTRODUCTION

Malaria is a leading tropical disease (TD) caused by Plasmodium parasites transmitted through the bite of infected female Anopheles mosquitoes (Milner, 2018). Plasmodium parasites, of which five species infect humans (Plasmodium falciparum, P. vivax, P. ovale, P. malariae, and P. knowlesi), cause malaria. Among these, P. falciparum and P. vivax are the most common and widely distributed. Female Anopheles mosquitoes act as vectors, transmitting the parasites to humans during blood meals. When the infected mosquito bites a human, it injects saliva containing Plasmodium parasites into the bloodstream. The parasites travel rapidly to the liver. In the liver, the parasites undergo a phase of rapid multiplication and replication, known as the liver stage or pre-erythrocytic stage. During this stage, the parasites mature and transform into a different form called merozoites. Once matured, the merozoites are released from the liver cells into the bloodstream. This release triggers the onset of symptoms associated with malaria infection. Merozoites invade red blood cells (erythrocytes), where they undergo further multiplication and replication. Inside the red blood cells, the parasites consume hemoglobin, destroying the host cell. As the parasites multiply within the bloodstream, the infected individual may begin to experience symptoms of malaria, which typically include fever, chills, headache, muscle aches, and fatigue. The severity of symptoms depends on various factors, including the species of Plasmodium involved and the individual's immune response (Garcia, 2010). If a mosquito bites an infected individual during this stage, it ingests the gametocytes (sexual stage of the parasite) present in the bloodstream along with the infected red blood cells. The gametocytes mature in the mosquito's gut and eventually develop into sporozoites, completing

the transmission cycle. This cycle perpetuates the spread of malaria from infected individuals to mosquitoes and vice versa, contributing to the ongoing transmission of the disease within endemic regions. Interrupting any stage of this transmission cycle is crucial for effective malaria control and prevention efforts (Milner, 2018).

Understanding China's Malaria Elimination Strategies: The research aims to comprehensively analyze the strategies and interventions implemented by China's National Malaria Elimination Programme (NMEP) to achieve zero indigenous cases of malaria. This includes examining the policy frameworks, vector control measures, surveillance systems, and community engagement strategies employed by China. **Identifying Lessons Learned:** The research seeks to identify key lessons learned from China's successful malaria elimination journey that can be applied to Namibia's context. This involves assessing the effectiveness, scalability, and sustainability of various malaria control interventions implemented in China and identifying best practices that can be adapted and implemented in Namibia. **Assessing Challenges and Opportunities:** The research aims to assess the unique challenges and opportunities faced by Namibia in its fight against malaria, taking into account the country's geographical, epidemiological, and socioeconomic context. This includes examining factors such as cross-border transmission, insecticide resistance, healthcare infrastructure, and community engagement. **Exploring Policy Implications:** The research seeks to explore the policy implications of drawing inspiration from China's malaria elimination experience in Namibia. This involves analyzing the alignment between China's malaria control strategies and Namibia's national malaria control policies, identifying areas for policy adaptation and innovation, and recommending policy interventions to

¹ Southern Medical University, China

* Corresponding author's e-mail: ndapewaojohannes@gmail.com

strengthen Namibia's malaria control efforts. Enhancing Collaboration and Knowledge Sharing: The research aims to foster collaboration and knowledge sharing between China and Namibia in the fight against malaria. This includes facilitating exchanges of experiences, lessons learned, and best practices between the two countries, leveraging existing partnerships and networks, and exploring opportunities for technical assistance and capacity building. Promoting Advocacy and Resource Mobilization: The research seeks to raise awareness and advocate for increased political commitment and resource mobilization for malaria control and elimination efforts in Namibia. This involves highlighting the importance of investing in malaria prevention, diagnosis, and treatment, and leveraging international support and funding mechanisms to strengthen Namibia's malaria response.

LITERATURE REVIEW

Malaria remains a significant public health challenge in many parts of the world, including Namibia, where the disease continues to pose a burden on healthcare systems and communities (Rokka & Khanal, 2023). In recent years, there has been growing interest in learning from successful malaria elimination experiences in other countries to inform and strengthen malaria control efforts in Namibia. This literature review aims to explore existing research and evidence on the topic of empowering Namibia's fight against malaria by drawing inspiration from China's remarkable malaria elimination journey.

China's Malaria Elimination Success

China's National Malaria Elimination Programme (NMEP) has achieved remarkable success in reducing the burden of malaria and ultimately eliminating indigenous transmission of the disease. Several studies have documented the strategies and interventions implemented by China, including the widespread use of insecticide-treated bed nets (ITNs), indoor residual spraying (IRS), early diagnosis and treatment of malaria cases, and community engagement initiatives (Feng *et al.*, 2022). These efforts have resulted in a significant decline in malaria cases and deaths, ultimately leading to zero indigenous cases of malaria reported in recent years.

Lessons Learned from China's Experience

Research on China's malaria elimination experience has identified several key lessons that can be valuable for malaria control efforts in Namibia. These lessons include the importance of strong political commitment, effective coordination and collaboration between government agencies and stakeholders, innovative approaches to vector control and surveillance, and community involvement in malaria prevention and control activities. Studies have also highlighted the role of research and innovation in informing evidence-based decision-making and adapting strategies to local contexts (Cao *et al.*, 2022).

Challenges and Opportunities in Namibia

While Namibia has made progress in reducing malaria

incidence and mortality, challenges remain in achieving malaria elimination. Studies have identified factors such as cross-border transmission from neighboring countries, insecticide resistance in mosquito vectors, limited access to healthcare services in rural areas, and resource constraints as barriers to malaria control efforts in Namibia. However, there are also opportunities for strengthening malaria control, including leveraging lessons learned from other countries, enhancing collaboration and knowledge sharing, and advocating for increased political commitment and funding for malaria elimination (Chung *et al.*, 2022).

One prominent global program aimed at eliminating malaria is the "Global Malaria Programme" (GMP) initiated by the World Health Organization (WHO). The main objective of the Global Malaria Programme is to reduce the global burden of malaria and work towards its eventual elimination. The program operates with the following aims: Reducing Malaria Morbidity and Mortality: The primary goal of the Global Malaria Programme is to significantly reduce the incidence of malaria-related illness and death globally. This involves implementing comprehensive strategies for prevention, diagnosis, and treatment in malaria-endemic regions. Scaling Up Interventions: The program aims to scale up proven interventions for malaria control, such as the distribution of insecticide-treated bed nets (ITNs), indoor residual spraying (IRS), and preventive treatment for vulnerable populations like pregnant women and children under five years old (Mumbengegwi *et al.*, 2018). Strengthening Health Systems: Another aim of the Global Malaria Programme is to strengthen health systems in endemic countries to enhance their capacity for malaria prevention, diagnosis, and treatment. This includes training healthcare workers, improving laboratory infrastructure, and ensuring the availability of essential medicines and supplies. Monitoring and Evaluation: The program emphasizes the importance of robust surveillance systems to monitor malaria trends and assess the impact of interventions. Regular monitoring and evaluation enable the identification of emerging challenges and the adaptation of strategies to address them effectively. Research and Innovation: The Global Malaria Programme supports research and innovation to develop new tools, technologies, and strategies for malaria control and elimination. This includes investments in vaccine development, drug discovery, insecticide resistance management, and novel vector control methods. Promoting International Collaboration: Collaboration among governments, non-governmental organizations (NGOs), international partners, and other stakeholders is essential for achieving malaria elimination goals. The Global Malaria Programme facilitates coordination and collaboration at the global, regional, and national levels to maximize impact and leverage resources (Africa, 2023). Overall, the Global Malaria Programme plays a crucial role in coordinating efforts to combat malaria worldwide, with the ultimate objective of eliminating this devastating disease and improving the health and well-being of

populations in malaria-endemic region

The latest World Malaria report states that 27 countries had fewer than 100 cases of the disease in 2022, up from six countries in 2000. Countries that have been achieving at least three consecutive years of zero indigenous cases of malaria (a case contracted locally with no evidence of importation from another endemic country) were given the WHO certification of malaria elimination. Furthermore since 2015, 12 countries have been certified by the WHO Director-General as malaria-free, and China is part of the free Malaria countries (P. Li, 2023). For Namibia to achieve these aims of GMP, pragmatic steps must be taken and lessons adopted from countries, like China, that have successfully eliminated Malaria. The purpose of this review is to present the Malaria situation in Namibia; the epidemiology, and control measures taken, as well as the successes achieved so far in Namibia. The review will also cover the challenges barring the successful elimination of Malaria in Namibia. The review will present the success story of China in its journey towards eliminating of Malaria. Lessons based on the Chinese story will be presented to facilitate Namibia's effort to achieving Malaria elimination by 2030.

Policy Implications and Recommendations

The literature underscores the importance of aligning Namibia's malaria control policies and strategies with evidence-based practices and lessons learned from successful elimination experiences in other countries such as China. Recommendations include integrating innovative approaches to vector control, strengthening surveillance systems, improving access to healthcare services, enhancing community engagement, and fostering collaboration between China and Namibia to share experiences and best practices.

In conclusion, the literature reviewed highlights the potential for empowering Namibia's fight against malaria by drawing inspiration from China's remarkable malaria elimination journey. By learning from China's successes, addressing challenges, and leveraging opportunities, Namibia can strengthen its malaria control efforts and work towards the goal of malaria elimination, ultimately improving the health and well-being of its population. Further research and collaboration between China and Namibia are essential for translating lessons learned into actionable strategies and policies for malaria control and elimination.

METHODOLOGY

A comprehensive electronic search was conducted in various online databases and search engines, such as PubMed, Cumulative Index for Nursing and Allied Health Literature (CINAHL), MEDLINE, EBSCO, and Google Scholar for available literature on Malaria in Namibia and China. Specific journals such as the Centers for Disease Control and Prevention Namibia (<https://wwwnc.cdc.gov/>), World Health Organization (<https://www.who.info/>), and African Journals Online (AJOL)

(<https://www.ajol.info/>), were also searched in addition for more literature on Malaria in Namibia. The search terms used were "Malaria in Namibia", "Malaria disease in Namibia", "China elimination of Malaria", "burden of Malaria in Namibia", "Malaria in China", "Malaria", and "Malaria and Tropical Diseases". The search terms were used separately and also were connected using Boolean operators such as "AND", "OR", "NOT". Specific articles found in the bibliography or references of other articles were also searched for using specific citation matcher or using Google search. There was ten-year restriction on for the time the studies were conducted or the article was published. Only studies published in English were extracted for the review. Both full-text literature and Abstracts were extracted for the review. A total of 38 articles and abstracts were retrieved from the search strategy. However, 18 articles satisfied the inclusion criteria (articles that contain: the epidemiology of Malaria in Namibia/China, the burden of Malaria in Namibia/China, the control and management of Malaria in Namibia /China, Malaria elimination programmes in Namibia/China, and population-based studies on Malaria in Namibia/China).

RESULTS AND DISCUSSION

Malaria Situation in Namibia

Namibia has made significant progress in the fight against malaria, but the disease remains a public health concern, particularly in certain regions of the country (Mumbengegwi *et al.*, 2018). Malaria is endemic in Namibia, with transmission occurring mainly in northern and northeastern regions, particularly in Kavango East, Kavango West, Zambezi, and Ohangwena regions. These areas experience seasonal malaria transmission, typically during the rainy season from November to April. The areas experience seasonal outbreaks of malaria due to the conducive environmental conditions for mosquito breeding. While the overall malaria burden in Namibia has decreased in recent years, the disease still poses a significant health threat, especially to vulnerable populations such as children under five years old and pregnant women. Severe malaria cases and fatalities are more common in these groups (Namibia ALMA Quarterly Report Quarter Four, 2023 Namibia ALMA Quarterly Report Quarter Four, 2023 Malaria, 2023). Malaria remains a public health problem in Namibia, with an estimated 13,740 cases in 2023, resulting in 15 deaths. There was a peak in malaria incidence in 2017 (47.5 per 1,000) which fell to 5.9 per 1,000 in 2021. Malaria transmission is confined to the north-east part of Namibia where malaria is endemic and about 72% of the population of the country is at risk. The annual reported number of malaria cases in 2022 was 11,849 with 28 deaths.

Malaria cases in communities surveyed from 2017 to 2022 (Namibia *et al.*), a) Country Wide, b) northern and northeastern regions (Source: 2023 Namibia ALMA., 2023). Namibia has implemented various malaria control and prevention strategies, including distributing

insecticide-treated bed nets (ITNs), indoor residual spraying (IRS) in high-risk areas, and community-based malaria education programs. Additionally, antimalarial drugs are provided for treatment and prophylaxis (Africa, 2023). The Namibian government provides diagnostic and treatment services for malaria through healthcare facilities across the country. Rapid diagnostic tests (RDTs) are widely used for the diagnosis of malaria, enabling prompt identification and treatment of cases. Artemisinin-based combination therapies (ACTs) are the recommended first-line treatment for uncomplicated malaria, while other antimalarial drugs are used for severe cases (Nghipumbwa *et al.*, 2018). Namibia has established a robust malaria surveillance system to monitor disease trends, detect outbreaks, and assess the effectiveness of control measures. Rapid response teams are deployed to investigate and control outbreaks promptly. Cross-border collaboration with neighboring countries is also emphasized to prevent the spread of malaria. Despite progress, Namibia faces several challenges in malaria control, including limited healthcare infrastructure in rural areas, insecticide resistance in mosquito vectors, and environmental factors that contribute to mosquito breeding (Nkya *et al.*, 2022). A continued investment in malaria control efforts, including research, surveillance, and community engagement, is essential to further reduce the malaria burden and work towards elimination. In summary, while Namibia has made significant strides in malaria control, the disease remains a significant public health challenge, particularly in specific regions with high transmission rates. Sustained efforts and investment are necessary to achieve the goal of malaria elimination in Namibia but more needs to be done.

Namibia's Malaria Elimination Programme

Namibia has been actively working towards malaria elimination through its National Vector-Borne Diseases Control Programme (NVDCP) (Nghipumbwa *et al.*, 2018). While Namibia has made significant progress in reducing malaria transmission, particularly in the northern regions, elimination efforts are ongoing, focusing on achieving zero indigenous cases of malaria. The NVDCP develops strategic plans and policies to guide malaria control and elimination efforts in Namibia. These plans outline specific objectives, interventions, and targets for reducing malaria transmission and ultimately achieving elimination. Namibia has established a robust malaria surveillance system to track the incidence and prevalence of malaria throughout the country. Surveillance data are used to identify high-risk areas, detect outbreaks, and assess the impact of control interventions. Indoor residual spraying (IRS) and the distribution of insecticide-treated bed nets (ITNs) are key components of Namibia's vector control strategy (Magesa *et al.*, 2019). These interventions target the *Anopheles* mosquitoes responsible for transmitting malaria and help reduce human-mosquito contact. Prompt diagnosis and treatment of malaria cases are essential for reducing transmission and preventing severe illness and

death. Namibia follows national treatment guidelines based on the WHO recommendations, ensuring access to effective antimalarial drugs for all individuals diagnosed with malaria. Community involvement and awareness-raising activities are critical for malaria elimination efforts. The NVDCP works closely with communities to promote preventive measures such as the use of bed nets, proper diagnosis and treatment of malaria, and environmental management to reduce mosquito breeding sites (Jacobson *et al.*, 2019).

Malaria knows no borders, and collaboration with neighboring countries is essential for successful elimination efforts. Namibia engages in cross-border initiatives to coordinate surveillance, share information, and harmonize control efforts with neighboring countries to prevent the importation and spread of malaria (Nkfusai *et al.*, 2022). Research and innovation play a vital role in informing malaria elimination strategies and interventions. Namibia supports research projects aimed at understanding local malaria transmission dynamics, assessing the effectiveness of control measures, and developing new tools and approaches for malaria elimination. Overall, Namibia's Malaria Elimination Programme reflects the country's commitment to achieving zero indigenous cases of malaria and improving the health and well-being of its population (Nghipumbwa *et al.*, 2018). Continued investment in malaria control and elimination efforts, along with sustained political commitment and international collaboration, will be essential for achieving this goal.

NVDCP implementation in Namibia countrywide (Source: Nghipumbwa *et al.*, 2018)).

Progress Towards Eliminating Malaria in Namibia

Namibia has made significant progress towards eliminating malaria, particularly in the northern regions where the disease burden is highest (Nghipumbwa *et al.*, 2018). The country has implemented a comprehensive malaria elimination strategy, focusing on various interventions to reduce malaria transmission and ultimately achieve zero indigenous cases of the disease. Namibia has seen a notable decline in malaria cases over the years, reflecting the effectiveness of its control and elimination efforts (Mumbengegwi *et al.*, 2018). The implementation of vector control measures such as indoor residual spraying (IRS) and the distribution of insecticide-treated bed nets (ITNs) has contributed to reducing human-mosquito contact and malaria transmission. Namibia has strengthened its healthcare infrastructure to ensure prompt diagnosis and treatment of malaria cases. Rapid diagnostic tests (RDTs) are widely available, enabling healthcare workers to diagnose malaria quickly and accurately, especially in remote areas where laboratory facilities may be limited. Access to effective antimalarial drugs for treatment has also been enhanced, reducing the risk of severe illness and death. Namibia has established a robust malaria surveillance system to track the incidence and prevalence of the disease.

Surveillance data are used to identify malaria hotspots, detect outbreaks, and target interventions effectively. Real-time monitoring allows for timely responses to changes in malaria transmission dynamics, ensuring that control measures remain effective. Community involvement is crucial for successful malaria elimination efforts. Namibia has engaged with communities through various channels to raise awareness about malaria prevention and control measures. Community members are encouraged to participate actively in malaria control activities, including the use of bed nets, seeking early diagnosis and treatment, and reporting suspected cases to health authorities. Malaria elimination efforts in Namibia are not limited to its borders. The country collaborates with neighboring countries to coordinate surveillance and control activities, share information, and address cross-border malaria transmission. This collaboration is essential for preventing the importation and spread of malaria from neighboring countries with higher malaria burdens. Research and Innovation: Namibia invests in research to improve understanding of local malaria transmission dynamics and to evaluate the effectiveness of control interventions. Research findings inform evidence-based decision-making and guide the adaptation of malaria elimination strategies to local contexts(Nkya *et al.*, 2022). While Namibia has made significant progress towards eliminating malaria, challenges remain, including sustaining progress in high-transmission areas, addressing insecticide resistance, and ensuring continued political commitment and funding for malaria control efforts. However, with continued dedication and collaboration, Namibia is well-positioned to achieve its goal of malaria elimination.

Challenges in the Elimination of Malaria in Namibia

Namibia began fighting Malaria many decades ago, with organized efforts dating back to the colonial era. Since independence, the Namibian government prioritized healthcare and public health initiatives, including efforts to combat malaria but Namibia still faces considerable challenges in malaria control, including limited healthcare infrastructure, inadequate resources, and a high burden of malaria in certain regions, particularly in the northern parts of the country(Magesa *et al.*, 2019). Since 2000, almost 98% of malaria transmission is concentrated in the northern regions of Namibia, particularly in areas bordering Angola, Zambia, and Zimbabwe(Nkya *et al.*, 2022). To meet the goal of NVDCP in eliminating malaria by 2030, the programme aims to improve the health and well-being of Namibia's population and contribute to broader public health goals in the country. Namibia, like other nations, failed to meet this goal due to programme implementation challenges.

Some remote and rural areas in Namibia lack adequate healthcare infrastructure, including health facilities, diagnostic tools, and trained healthcare workers. This can impede timely diagnosis and treatment of malaria cases, particularly in hard-to-reach communities. The

emergence of insecticide resistance in mosquito vectors poses a significant challenge to vector control efforts in Namibia. Resistance to commonly used insecticides can reduce the effectiveness of indoor residual spraying (IRS) and insecticide-treated bed nets (ITNs), leading to increased malaria transmission. Namibia shares borders with several countries where malaria is endemic, including Angola and Zambia(Mumbengegwi *et al.*, 2018). Cross-border movement of people and goods facilitates the spread of malaria parasites across borders, making it challenging to control transmission and prevent reintroduction of the disease. Climate change can influence the distribution and abundance of mosquito vectors, as well as the transmission dynamics of malaria. Variations in rainfall patterns and temperature can affect mosquito breeding habitats and the length of the malaria transmission season, posing challenges to malaria control efforts. Limited access to healthcare services, particularly in rural and marginalized communities, can hinder early diagnosis and treatment of malaria. Factors such as distance to health facilities, transportation barriers, and socioeconomic factors may prevent individuals from seeking timely care. Sustaining community engagement and promoting behavior change remain essential for effective malaria control and prevention(Chung *et al.*, 2022). Ensuring consistent use of preventive measures such as bed nets, seeking prompt treatment for fever, and adhering to treatment regimens are crucial but can be challenging to achieve. Adequate funding and resources are essential for implementing malaria control interventions, including procurement of insecticides, diagnostic tools, and antimalarial drugs. Limited financial resources and competing health priorities may constrain the scale and effectiveness of malaria control efforts.

Health System Barriers

Inadequate healthcare infrastructure, particularly in rural and remote areas, poses a significant barrier to malaria elimination efforts. Health facilities may lack essential resources such as diagnostic tools, antimalarial drugs, and trained healthcare personnel, making it challenging to provide timely diagnosis and treatment to affected individuals. Shortages of trained healthcare workers, including doctors, nurses, and community health workers, limit the capacity of the health system to deliver malaria control interventions effectively. In some areas, healthcare personnel may be overburdened with multiple responsibilities, reducing their ability to focus on malaria prevention and treatment(Mumbengegwi *et al.*, 2018). Limited access to healthcare services, including geographical barriers, transportation challenges, and financial constraints, prevent individuals from seeking timely diagnosis and treatment for malaria(Kezelee *et al.*, 2023). In rural and marginalized communities, where healthcare facilities are scarce, access to essential malaria interventions may be particularly limited. Variations in the quality of care provided at health facilities can affect the effectiveness of malaria control interventions. Inadequate

training of healthcare workers, poor adherence to treatment protocols, and deficiencies in the supply chain management of antimalarial drugs and diagnostic tests can compromise the quality of malaria diagnosis and treatment services. Weak health information systems, including inadequate data collection, reporting, and surveillance mechanisms, hinder the ability of health authorities to monitor malaria trends, detect outbreaks, and assess the impact of control interventions. Improving the reliability and timeliness of health data is essential for evidence-based decision-making in malaria elimination efforts. Engaging communities in malaria prevention and control activities and promoting behavior change are essential components of successful elimination efforts. However, cultural beliefs, misconceptions about malaria, and low health literacy levels may impede community participation and adherence to preventive measures such as bed net usage and seeking prompt treatment for fever (Jacobson *et al.*, 2019). Limited financial resources and competing health priorities can constrain the scale and effectiveness of malaria control interventions in Namibia. Sustainable funding for malaria elimination efforts is essential to ensure the availability of essential commodities, strengthen health systems, and sustain community engagement activities over the long term.

Malaria in China

Malaria has historically been a significant public health concern in China, particularly in rural areas of southern provinces such as Yunnan, Hainan, Guangxi, and Guizhou (Nadia & Lu, 2022). However, significant progress has been made in malaria control and elimination efforts in recent decades. Malaria has been endemic in China for centuries, with periodic outbreaks recorded throughout its history. The disease was particularly prevalent in rural areas with favorable mosquito breeding habitats, such as rice paddies and marshlands. China has implemented various malaria control measures over the years, including indoor residual spraying (IRS) of insecticides, distribution of insecticide-treated bed nets (ITNs), and early diagnosis and treatment of malaria cases. These efforts have contributed to a significant reduction in malaria incidence and mortality (X. Li *et al.*, 2022).

In 2010, China launched the National Malaria Elimination Programme (NMEP) with the goal of eliminating indigenous malaria transmission by 2020 (Nadia & Lu, 2022). The NMEP aimed to interrupt local transmission of the disease, particularly in regions with low or moderate malaria transmission, and prevent the reintroduction of malaria from neighboring countries. China has made remarkable progress towards malaria elimination in recent years. The country reported zero indigenous cases of malaria in 2017 and has maintained zero indigenous cases since then. This achievement is a testament to the effectiveness of China's malaria control and elimination efforts, including strong political commitment, investment in healthcare infrastructure, and

community engagement (Nkfusai *et al.*, 2022).

Key among the strategies taken by the Chinese government to eliminate Malaria was a strong political will and sense of leadership. Various institutions were tasked in elimination of malaria with strength to carry out their responsibilities in a timely, effective and efficient manner (X. Li *et al.*, 2022). There was also a strong collaboration and cooperation between Chinese government departments and an active participation of individuals and communities in malaria endemic areas. International collaboration also played a significant role in eliminating malaria in China. China worked closely with international organizations like the WHO to implement malaria control measures and ensure that their efforts aligned with global best practices. There is a continuous and vibrant surveillance and monitoring to ensure the continued success of their malaria elimination effort. China implemented a rigorous surveillance and monitoring system, which included periodic surveys, sentinel site surveillance, and case reporting (Nkfusai *et al.*, 2022).

Lessons from China's successful Elimination of Malaria (Feng *et al.*, 2022)

Namibia can learn several valuable lessons from China's success in controlling Malaria

1. Political commitment: Strong political will and commitment from the government played a crucial role in China's success. Namibia can learn from this by ensuring that Malaria elimination remains a priority on the national health agenda, with dedicated resources and continuous support.

2. Multisector collaboration: China's approach to controlling malaria involved collaboration between various sectors, including health, education, and research institutions. Namibia can benefit from fostering similar partnerships among stakeholders, such as government agencies, NGOs, and international organizations, to ensure a coordinated and effective response.

3. Tailoring malaria control strategies to local contexts: China's success can be partly attributed to the adaptation of control strategies to suit local conditions, including varying vector species, parasite strains, and socio-economic factors. Namibia can take a similar approach by developing context-specific strategies that address the unique challenges faced in various 14 regions of the country.

4. Comprehensive approach: China employed a comprehensive strategy, encompassing mass drug administration, vector control, case detection, treatment, health education, and community mobilization. Namibia can learn from this by ensuring that all aspects of malaria control measures are addressed in a holistic manner, with equal emphasis on prevention, treatment, and management of complications.

5. Health education and community mobilization: Public awareness and community engagement were crucial components of China's strategy. Namibia can benefit from intensifying health education efforts and actively involving communities in the planning and

implementation of malaria control activities. This can help improve understanding of the disease, increase participation in malaria campaigns, and encourage early detection and treatment of cases.

There is no review of research on empowering Namibia's fight against Malaria in Namibia. The study proposes a novel approach of transferring knowledge and lessons learned from China's successful malaria elimination experience to inform and strengthen malaria control efforts in Namibia. By drawing inspiration from China's remarkable achievements in malaria elimination, Namibia can adapt and implement proven strategies and interventions tailored to its own context. Furthermore, the research contributes valuable knowledge to the field of malaria control and elimination by leveraging China's successful malaria elimination journey to empower Namibia in its fight against malaria. Through knowledge transfer, comparative analysis, policy innovation, community engagement, and advocacy, the research advances our understanding of effective strategies for malaria control and elimination and supports efforts to achieve the global goal of malaria eradication. The study addresses numerous research gaps in the field of malaria control and elimination such as contributing valuable insights, knowledge transfer, and evidence-based strategies to strengthen malaria control efforts in Namibia and other malaria-endemic regions.

CONCLUSION

The successful elimination of malaria in China serves as an inspiring example for countries like Namibia that are still grappling with this debilitating disease. By learning from China's experience and adopting key strategies such as political commitment, multisector collaboration, tailored local approaches, comprehensive control measures, and a strong emphasis on health education and community mobilization, Namibia has the ability to make significant strides toward eliminating malaria by 2030. Namibia must develop and maintain a strong national strategy, strengthening healthcare systems, enhancing surveillance and monitoring, investing in research and innovation, promoting cross-border collaboration, engaging diverse stakeholders, and ensuring active community participation in the process. By following China's lead and implementing these strategies, Namibia can work towards eradicating malaria as a public health issue, ultimately enhancing the health of its population and promoting sustainable development.

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