



Full length article

Strengthening capacity-building in malaria and schistosomiasis control under China-Africa cooperation: Assessing a case study of Burkina Faso



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ABSTRACT

Malaria and schistosomiasis are highly prevalent in Burkina Faso, whereas China has successfully eliminated malaria as well as schistosomiasis as a public health problem. To implement the China-Africa health cooperation initiative, a series of activities were launched since 2019 to enhance understanding and cooperation among malaria and schistosomiasis professionals in China and Burkina Faso. This study described the achievements of the First Virtual Symposium of China-Burkina Faso Cooperation on Schistosomiasis and Malaria Control. Pre- and post-test questionnaires were employed to study the knowledge changes of participants regarding malaria and schistosomiasis control and elimination, explore capacity-building priorities, and identify potential challenges. Chi-squared statistics were used to compare the differences between sub-groups, and p value < 0.05 was considered statistically significant. Participants ranked their preferences for challenges and capacity-building priorities in future cooperation. The responses of participants from both China and Burkina Faso indicated effective improvement in their general knowledge about the diseases whereas the improvement in professional knowledge on malaria and schistosomiasis was limited. The total correct response rate increased from 54.08% to 66.78%. Chinese participants had better schistosomiasis knowledge than Burkina Faso participants did, but the same result was not found for malaria. Diseases control strategies, surveillance and response system, and diagnostics techniques were identified as the top three priorities for future capacity building. Participants from China and Burkina Faso shared almost the same views about challenges except with respect to pathogens, which the former saw as a major challenge and the latter did not. The study findings will help policymakers, health managers, and researchers to understand the future cooperation between Burkina Faso and China on malaria and schistosomiasis.

1. Background

According to estimates from the World Health Organization (WHO), Africa has the highest global burden of malaria and schistosomiasis.

Approximately 95% of malaria cases occur in Africa, and more than 90% of those requiring treatment for schistosomiasis live in Africa [1,2]. Burkina Faso, located in sub-Saharan Africa, is among top ten countries globally with the highest malaria incidence, accounting for 3.4% of

Abbreviations: WHO, World Health Organization; INCAM, Institution-based Network on China-Africa Cooperation for Malaria Elimination; NIPD, National Institute of Parasitic Diseases; China CDC, Chinese Center for Disease Control and Prevention; IRSS, Institut de Recherche en Sciences de la Santé; MDA, Mass drug administration.

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global malaria cases [1]. It has a moderate average prevalence of schistosomiasis, but its prevalence rate has reached over 80% in some areas of the country [3–5]. Thus, malaria and schistosomiasis are two major public health issues that are endemic throughout Burkina Faso [3,6]. Burkina Faso, which must address the issue on control effectiveness of malaria and schistosomiasis, urgently needs more capacity building in this area.

China has made notable progress in malaria and schistosomiasis elimination. China and Africa have engaged in pragmatic cooperation in health since 1963, when the first Chinese medical team was dispatched to Algeria [7]. The China-Africa health cooperation on malaria and schistosomiasis has become crucial and priority area since the 2018 Forum on China-Africa Cooperation [8]. In 2021, the WHO certified China as malaria free [1]. China also successfully attained the goal of eliminating schistosomiasis as a public health problem in 2015 [9]. China is now prepared to share its experience and techniques with malaria- and schistosomiasis-endemic countries [10,11].

Since the resumption of China-Burkina Faso diplomatic relations in May 2018, cooperation between the two countries in health cooperation has also resumed. Efforts to increase mutual understanding the basis of cooperation are an important priority for China and Burkina Faso. Moreover, strengthening health workers' capacities can enhance cooperation outcomes. To implement a China-Burkina Faso health cooperation initiative, a series of exchange activities were organized from 2019–2021. Initially, representatives from Burkina Faso were invited to visit China and attend the Institution-based Network on China-Africa Cooperation for Malaria Elimination (INCAM) meeting in 2019, 2020, and 2021. These meetings aimed at promoting malaria elimination by strengthening the joint efforts from Chinese and African public health institutions [12].

Evaluations of capacity-building in increasing an individual ability are scarce [13], and outcome indicators from different programs vary. Several indicators including evaluation of the changes in knowledge between pre- and post- interventions [13–16]; the number of scientific publications [17]; and indicators describing the implementation process, outcomes and lessons learned [18] have been used to assess the capacity-building initiatives. In addition, several quantitative or qualitative indicators have been adopted to capture the effect of capacity-building interventions on individuals' knowledge retention and acquisition [13].

This study describes the implementation of The First Virtual Symposium of China-Burkina Faso Cooperation Symposium on Schistosomiasis and Malaria Control, assesses the knowledge changes among personnel from China and Burkina Faso regarding malaria and schistosomiasis control and elimination, and explores the priority areas of cooperation and perceived potential challenges using two web-based questionnaires completed before and after the symposium. The findings provide valuable information on capacity building and future priorities for China-Burkina Faso cooperation on malaria and schistosomiasis.

2. Methods

2.1. Symposium design and participant recruitment

The First Virtual Symposium of China-Burkina Faso Cooperation on Schistosomiasis and Malaria Control was held in December 2021, cosponsored by the National Institute of Parasitic Diseases (NIPD), Chinese Center for Disease Control and Prevention (China CDC) and the Institut de Recherche en Sciences de la Santé (IRSS) in Burkina Faso. For historical reasons, health cooperation between China and Burkina Faso started late with a relatively weak foundation. In this first symposium, the schedule was specially designed. On the first day of the symposium, the general situation and progress of schistosomiasis and malaria in China and Burkina Faso were introduced. Two parallel sessions were set up on the second day to share Chinese technology and experience in controlling malaria and schistosomiasis. This was done to provide an

update on the schistosomiasis and malaria situation and challenges, and to share China's skills and experience for the control of schistosomiasis and malaria. Two thematic discussions were also arranged to promote mutual understanding.

The participants, who worked on or were interested in malaria and schistosomiasis, were enrolled from China's national CDCs, provincial CDCs, and universities, and from Burkina Faso's national health institutions and universities.

2.2. Questionnaire survey

To obtain an understanding of participants' knowledge background and learning outcomes and to explore their feedback on the potential cooperation on schistosomiasis and malaria between two countries, two web-based questionnaires were designed and later revised by 13 senior experts. One was a pre-test questionnaire comprising 40 questions in 4 parts: basic information on the participants; general questions, including concepts and global goals relating to the control of malaria and schistosomiasis; professional questions on schistosomiasis; and professional questions on malaria. The professional questions related to reports presented by the invited senior experts from the symposium. The other questionnaire was a post-test questionnaire that included all the pre-test questionnaire questions with three additional feedback questions and two open-ended questions. In this questionnaire, two feedback questions asked participants to rank their preferences regarding the challenges and future cooperation with capacity building on malaria and schistosomiasis between the two countries. The questionnaires contained questions that had correct and incorrect answers. Most questionnaires ask respondents to give right-or-wrong answers, not to give their opinions.

2.3. Questionnaire distribution

All participants were invited to complete the pre-and post-test questionnaire before and after the symposium. Willing participants were asked to complete the pre-test one day before the symposium and submit the post-test within ten days after the symposium. The two web-based questionnaires were delivered via e-mail, and two additional reminders were sent. Since the malaria and schistosomiasis sessions were held simultaneously from the second day of the symposium, the participants were required to complete only the relevant part of the questionnaire depending on the session they attended.

2.4. Data collection and analysis

The original results were sorted using WPS Office (Version 3.0.0, Kingssoft Office Corporation) and analyzed using R Software (Version 4.1.0, The R Foundation for Statistical Computing). The rate of correct responses was calculated as the number of questions answered correctly divided by the total number of questions. Chi-squared statistics were used to compare the difference between sub-groups, and *p* values less than 0.05 were considered statistically significant. Frequency was used to describe the ratio of the rank (number) selected to the total number of participants. Word clouds were created to show the "hot words" in participants' answers to open-ended questions using the "Wordcloud2" package.

2.5. Ethics approval and consent to participate

This study was approved by the Ethical Review Committee of the National Institute of Parasitic Diseases (NIPD) at Chinese Center for Disease Control and Prevention (Chinese Center for Tropical Disease Research). The survey was voluntary, and participants were notified that submitting responses to the questions online implied willingness to participate in this survey.

Table 1
Correct response rates on the pre-/post-test questionnaires on schistosomiasis and malaria for participants from China and Burkina Faso.

	General questions				Questions on schistosomiasis				Questions on malaria				Total			
	No. of questions	No. of questions answered correctly	Correct response rate (%)	χ^2	p value	No. of questions	No. of questions answered correctly	Correct response rate (%)	χ^2	p value	No. of questions	No. of questions answered correctly	Correct response rate (%)	χ^2	p value	
Pre-test-BF	275	183	66.55	10.44	0.001*	250	148	59.20	0.13	0.72	350	113	32.29	0.00	0.99	
Post-test-BF	220	176	80.00	1.04	0.31	100	62	62.00	0.98	0.32	140	46	32.86	0.90	0.34	
Pre-test-CN	176	127	72.16	10.58	0.001*	160	119	74.38	3.03	0.08	224	86	38.39	0.31	0.58	
Post-test-CN	198	153	77.27	10.58	0.001*	130	104	80.00	0.98	0.32	70	32	45.71	0.31	0.58	
Pre-test-All	451	310	68.74	10.58	0.001*	410	267	65.12	3.03	0.08	574	199	34.67	0.31	0.58	
Post-test-All	418	329	78.71	10.58	0.001*	230	166	72.17	3.03	0.08	210	78	37.14	0.31	0.58	
											875	444	50.74	13.69	<0.001*	
											460	283	61.52	18.25	<0.001*	
											560	332	59.29	18.25	<0.001*	
											398	290	72.86	35.27	<0.001*	
											1435	776	54.08	35.27	<0.001*	
											858	573	66.78	35.27	<0.001*	

Note: * $p < 0.05$; BF: Burkina Faso; CN: China.

3. Results

A total of 41 participants attended the symposium, including 25 from Burkina Faso and 16 from China. Among them, 39.02% (16/41) were male and 60.98% (25/41) were female. Most (39/41, 95.12%) participants were aged over 25 years, and over half (21/41, 51.22%) of the participants worked at national-level institutions.

All the participants completed the pre-test questionnaire, whereas 38 participants completed the post-test questionnaire. Table 1 shows the correct response rates of general questions, schistosomiasis questions, and malaria questions on the pre-test and post-test questionnaire. In total, the mean of total correct response rates were 54.08% (standard deviation 12.48%) and 66.78% (standard deviation 15.56%) on the pre-test and post-test, respectively. There were no gender differences in the correct response rate of participants before and after the test, but the correct response rate increased with age. The correct response rates for the older age group (> 35 years) were significantly better than the younger age group (≤ 35 years) ($p < 0.05$) (Fig. 1). The chi-squared analysis showed that the total correct response rate in the post-test was significantly higher than that in the pre-test ($\chi^2 = 35.272, p < 0.001$), whereas the correct response rate of the general questions on the post-test was higher than that on the pre-test ($\chi^2 = 10.578, p = 0.001$). There was no difference in the correct response rates of professional questions of schistosomiasis and malaria between the post-test and pre-test ($p > 0.05$). In terms of the country of the participants, significant differences existed between the pre-test and post-test on the total correct response rates for the Burkina Faso ($\chi^2 = 13.693, p < 0.001$) as well as the Chinese participants ($\chi^2 = 18.246, p < 0.001$). Upon comparing the correct response rate of the participants between the two countries, the correct response rate of Chinese participants on the post-test was higher than that of Burkina Faso participants ($\chi^2 = 11.869, p < 0.001$), whereas the correct response rate of Chinese participants on schistosomiasis questions was higher than that for Burkina Faso participants on both the pre-test ($\chi^2 = 5.400, p = 0.02$) and post-test ($\chi^2 = 8.244, p < 0.001$).

Fig. 2 shows the participants' learning expectations and lessons learned from the symposium. Before the symposium (Fig. 2a), participants were interested in learning disease control strategies and mechanisms, the current situation, prevalence and treatment of schistosomiasis and malaria, and the effective approaches in China. After the symposium (Fig. 2b), participants understood that government leadership and ownership were important in both malaria and schistosomiasis control and elimination programs. Moreover, they learned that several approaches, such as the One Health approach, response and surveillance systems, scientific evidence-based approaches, multi-sectoral collaboration, reliable diagnosis methods, and the application of mass drug administration (MDA)/using mollusciciding/vector control were critical for disease control. Furthermore, most participants expressed their willingness for further cooperation between the two countries.

Participants from Burkina Faso thought that the challenges to cooperation between the two countries primarily pertained the differences in control and elimination strategies; human resources; environmental resources; political, social, and cultural conditions; and funding (Fig. 3a). Nevertheless, Chinese participants thought different pathogens (e.g., species of *Schistosoma* spp. and *Plasmodium* spp.) were also an important challenge, more so than did the participants from Burkina Faso ($\chi^2 = 3.8777, p = 0.049$).

Regarding future cooperation in capacity building (Fig. 3b), Burkina Faso participants identified disease control strategies, surveillance and response system, and diagnostics techniques as the three priorities, with disease control strategies being the most important. Chinese participants agreed on the three priorities; however, significant differences were observed in the recognition of the importance of diagnostics techniques ($\chi^2 = 43.189, p < 0.001$), disease control strategies ($\chi^2 = 42.711, p < 0.001$), and genetic/molecular research ($\chi^2 = 27.075, p < 0.001$) between Burkina Faso and Chinese participants.

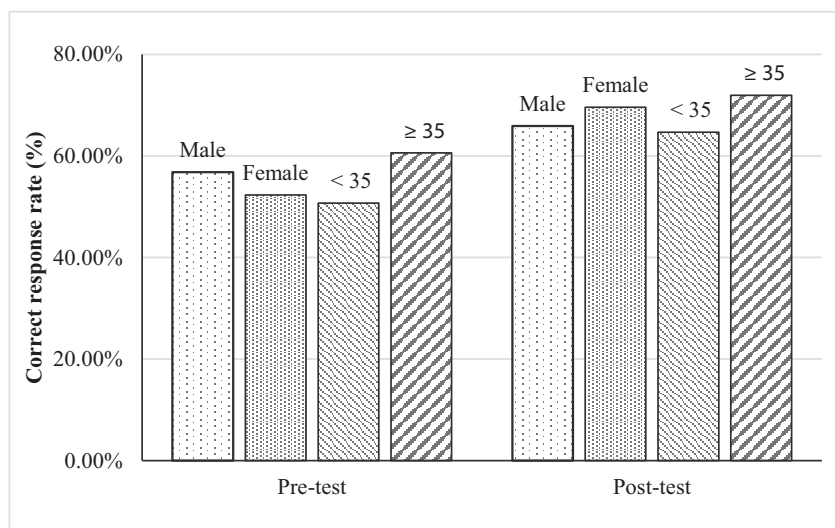


Fig. 1. Correct response rates on the pre-/post-questionnaires on schistosomiasis and malaria of all participants by gender and age group.

4. Discussion

As the health cooperation between China and Africa further deepens, new opportunities and challenges have emerged. Africa has the highest global burden of malaria and schistosomiasis, while China has made notable progress in the fight against both. Based on The First Virtual Symposium of China-Burkina Faso Cooperation on Schistosomiasis and Malaria Control, this study offered a preliminary understanding of participants’ knowledge background, the state of current knowledge about malaria and schistosomiasis, and the needs of future cooperation in capacity building.

The correct response rates on the pre- and post-knowledge assessment showed that this two-day symposium played a positive role in increasing the knowledge of the participants, but participants made limited progress regarding professional knowledge on malaria and schistosomiasis. This implies that a short-term symposium can enhance common sense knowledge well, but increasing professional knowledge requires long-term training. In addition, Chinese participants acquired knowledge about schistosomiasis better than Burkina Faso participants did, although the same result was not found for malaria. This could be connected to the fact that China eliminated malaria last year while Burkina Faso is still in the process of fighting malaria.

According to the pre-test results, most Burkina Faso participants were curious about how China eliminated malaria and controlled schistosomiasis and were interested in the strategies and mechanisms as well as what Burkina Faso could learn from China. The Chinese participants were interested in knowing about the basic situation and specific needs of Burkina Faso. Owing to the short period of cooperation, the two countries

are not yet familiar with each other’s situations. A deeper understanding of one another could help achieve health collaboration that matches the needs of both countries. This symposium provided a platform for exploratory communication on malaria and schistosomiasis between the two countries.

Regarding the cooperation challenges between the two countries, participants shared almost the same views, except on one aspect. Chinese participants saw the difference in pathogens as a major challenge, unlike Burkina Faso participants. Unlike malaria, the schistosomiasis pathogens differ between China and Burkina Faso. *Schistosoma japonicum* is the only species leading to human schistosomiasis in China, whereas in Burkina Faso, two additional species are involved: *Schistosoma haematobium* and *Schistosoma mansoni* [3,4]. In Burkina Faso, the main strategy for schistosomiasis control was mass praziquantel administration, which has proven effective against all three *Schistosoma* species [4]. However, the prevalence of schistosomiasis continues to be high in Burkina Faso currently. At least four possible issues affect schistosomiasis management in Burkina Faso. First, treatment may be inadequate, especially in areas with particularly high infection and transmission levels. Second, although the overall coverage of MDA appears to be adequate, focal treatment coverage is not satisfactory. Third, specific social or environmental factors lead to focal transmission despite the benefits of preventive chemotherapy. Fourth, a lack of environmental snail control and focal use of molluscicides, result in permanent transmission through high snail density and infectivity.

China was once endemic with serious malaria and schistosomiasis, similar to Burkina Faso’s current situation. China’s experience and lessons in treating malaria and schistosomiasis are worth sharing with

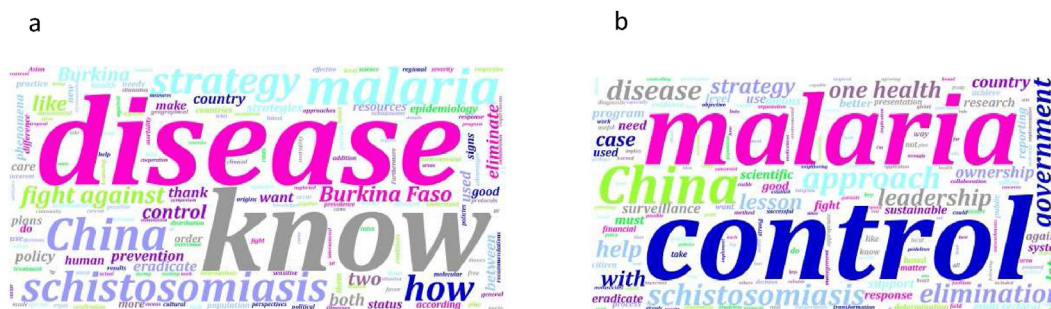


Fig. 2. Word clouds of participants’ expectations and learnings before and after the symposium. a. Word clouds of expected learnings before the symposium. b. Word clouds of learned from the symposium.

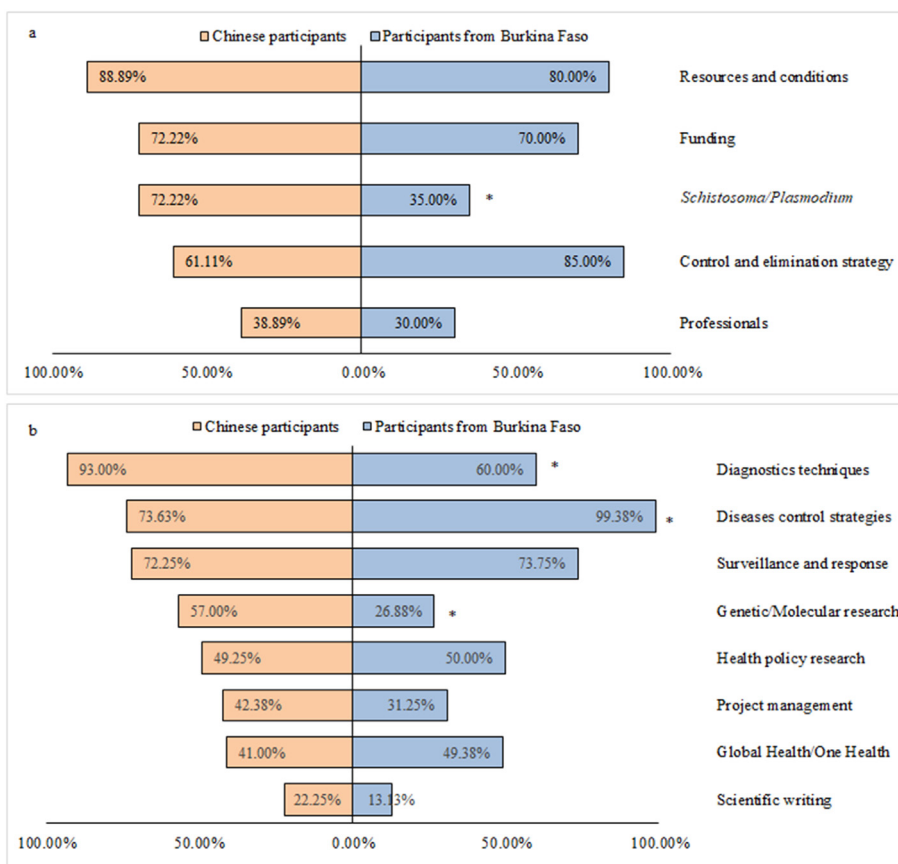


Fig. 3. Challenges and future cooperation in capacity building on schistosomiasis and malaria for China and Burkina Faso. a. The challenges of China and Burkina Faso may face in schistosomiasis and malaria cooperation from the standpoints of Chinese and Burkina Faso participants (the frequency in each bar chart indicates the percentage of total participants who chose this option). b. Future cooperation in capacity building on schistosomiasis and malaria from the standpoints of Chinese and Burkina Faso participants (the percentage in each bar represents the sum of the important weights for participants who selected this option). Note: * $p < 0.05$.

Burkina Faso. Malaria and schistosomiasis are both notifiable diseases in China, receiving strong government leadership and political commitment. Sustainable monitoring and response activities, scientific diagnostic tools to guide treatment strategies in different areas, effective snail control tools and precision mapping of snail distribution, and the One Health approach, in particular, have been proven effective in schistosomiasis control in China [11]. The One Health approach is a comprehensive and systematic method, covering human, animal, and environment health, which can be leveraged to solve health problems, such as controlling and eliminating schistosomiasis and malaria [19,20]. Effective lessons for malaria control in China include discovering the anti-malarial drug Artemisinin, the new “1-3-7” approach for malaria case surveillance, favorable environment and patriotic health campaigns, and tailored interventions in different malaria endemic areas [10]. Some of China’s experiences have been adapted and transferred to African countries, for example, via the China-Tanzania Cooperation Project of Malaria Control [21,22] and the China and Zanzibar Cooperation Project of Schistosomiasis Control [23]. The first priority for future cooperation is capacity building, which involves further disseminating China’s malaria and schistosomiasis control strategies, monitoring and surveillance systems, and improving diagnostic skills. The second is platform building to expand mutual understanding and encourage more partners to participate. The third is exploring funding channels and setting up joint pilots and cooperation projects to share China’s experiences.

The cooperation between China and Burkina Faso on malaria and schistosomiasis has both strengths and weaknesses. China and Burkina Faso are extremely willing to cooperate to address issues on malaria and schistosomiasis and have explored the priorities for future cooperation. From 2019–2021, a series of mutual visits and bilateral/multilateral workshops were conducted. An agreement was

signed to join INCAM, which was initiated by China, indicating gradually increasing mutual trust, friendship, and partnership. However, cooperation between the two countries is in its initial phase, and a cooperation strategy is yet to be formulated. Future cooperation should be broadened and made more in-depth through practical activities.

This study has some limitations. First, the overall ability of professionals in relation to malaria and schistosomiasis in China and Burkina Faso cannot be fully reflected because of the limited number of symposium participants, thus, further assessments should be conducted in the future. Second, it is difficult to achieve a 100% recovery rate since the questionnaires were mainly distributed through e-mail, which may have led to bias. Third, learning effectiveness may have been affected by unstable internet connection, thus, the correct response rate may have been underestimated.

5. Conclusion

This study is the first attempt to explore knowledge changes among participants from China and Burkina Faso at a virtual symposium on malaria and schistosomiasis. The study also clarified the priorities for capacity building and cooperation challenges for the two countries. The general knowledge of the participants increased but the improvement of professional knowledge on malaria and schistosomiasis was limited. Burkina Faso participants expressed a strong interest in China’s experience in controlling and eliminating malaria and schistosomiasis. Strengthening strategic and skill training based on these identified needs and deepening the cooperation between the countries to effectively apply China’s experience to the context of Burkina Faso so as to eliminate malaria and schistosomiasis is recommended.

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Declaration of competing interests

Xiao-Nong Zhou is the Editor-in-Chief of *Science in One Health*, and Dramane Zongo is the Associate Editor of *Science in One Health*. There are no other interests to declare.

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Authors' Contributions

HML, DAD, and SNL collected the data and wrote the first draft; HML, DAD, SL, DZ, DQW, NX, PSD, and XNZ drafted and modified the questionnaire; NX, PSD, and XNZ supervised the whole project; DE provided important suggestions; WD, YJQ, LLH, and YYG revised the first draft. All authors read and approved the final manuscript.

Data availability statement

Please contact the corresponding author for data requests.

References

- [1] World Health Organization, World Malaria Report 2021, World Health Organization, Geneva (2021), <https://www.who.int/teams/global-malaria-programme/reports>. accessed 10 July 2022.
- [2] D. Rinaldo, J. Perez-Saez, P. Vounatsou, J. Utzinger, J.L. Arcand, The economic impact of schistosomiasis, *Infect. Dis. Poverty*. 10 (2021) 134, <https://doi.org/10.1186/s40249-021-00919-z>.
- [3] M. Bagayan, D. Zongo, A. Oueda, H. Sorgho, B. Savadogo, F. Drabo, et al., Prevalence of schistosomiasis and soil-transmitted helminth infections among schoolchildren in Burkina Faso, *Med. Sante Trop*. 26 (2016) 267–272, <https://doi.org/10.1684/mst.2016.0570>.
- [4] H. Ouedraogo, F. Drabo, D. Zongo, M. Bagayan, I. Bamba, T. Pima, et al., Schistosomiasis in school-age children in Burkina Faso after a decade of preventive chemotherapy, *Bull. World Health Organ*. 94 (2016) 37–45, <https://doi.org/10.2471/BLT.15.161885>.
- [5] M. Cisse, I. Sangare, A.D. Djibougou, M.C. Tahita, S. Gnissi, J.K.W. Bassinga, et al., Prevalence and risk factors of *Schistosoma mansoni* infection among preschool-aged children from Panamasso village, Burkina Faso, *Parasit. Vectors* 14 (2021) 185, <https://doi.org/10.1186/s13071-021-04692-8>.
- [6] A. Koukounari, A.F. Gabrielli, S. Toure, E. Bosque-Oliva, Y. Zhang, B. Sellin, et al., *Schistosoma haematobium* infection and morbidity before and after large-scale administration of praziquantel in Burkina Faso, *J. Infect. Dis.* 196 (2007) 659–669, <https://doi.org/10.1086/520515>.
- [7] G.F. Gao, J.N. Nkengasong, Public health priorities for China-Africa cooperation, *Lancet Public Health* 4 (2019) e177–e178, [https://doi.org/10.1016/S2468-2667\(19\)30037-4](https://doi.org/10.1016/S2468-2667(19)30037-4).
- [8] The Ministry of Foreign Affairs of the People's Republic of China, Forum on China-Africa Cooperation Beijing Action Plan (2019–2021), Beijing (2018), <http://fo.cacsummit.mfa.gov.cn/eng/>. accessed 1 August 2022.
- [9] W. Wang, R. Bergquist, C.H. King, K. Yang, Elimination of schistosomiasis in China: current status and future prospects, *PLoS Negl. Trop. Dis.* 15 (2021), e0009578, <https://doi.org/10.1371/journal.pntd.0009578>.
- [10] D. Wang, S. Lv, W. Ding, S. Lu, H. Zhang, K. Kassegne, et al., Could China's journey of malaria elimination extend to Africa? *Infect. Dis. Poverty* 11 (2022) 55, <https://doi.org/10.1186/s40249-022-00978-w>.
- [11] E.M. Abe, E. Tambo, J. Xue, J. Xu, U.F. Ekpo, D. Rollinson, et al., Approaches in scaling up schistosomiasis intervention towards transmission elimination in Africa: leveraging from the Chinese experience and lessons, *Acta Trop.* 208 (2020), 105379, <https://doi.org/10.1016/j.actatropica.2020.105379>.
- [12] S. Lu, L. Huang, L. Duan, Q. Xu, X. Ma, W. Ding, et al., Role of international network on surveillance and response system leading to malaria elimination: China's engagement in global health, *Infect. Dis. Poverty* 11 (2022) 64, <https://doi.org/10.1186/s40249-022-00991-z>.
- [13] A. Mayor, G. Martinez-Perez, C.K. Tarr-Attia, B. Breeze-Barry, A. Sarukhan, A.M. Garcia-Sipido, et al., Training through malaria research: building capacity in good clinical and laboratory practice in Liberia, *Malar. J.* 18 (2019) 136, <https://doi.org/10.1186/s12936-019-2767-1>.
- [14] J.A. Okeniyi, M.Y. Ijaduola, O.T. Elugbaju, O.S. Fakoyejo, B. Adeyefa, O.T. Bamigboye-Taiwo, et al., Community advocacy and capacity building of community health workers on rheumatic heart disease in osun state, Nigeria, *W. Afr. J. Med.* (2022) 756–760.
- [15] I.A. Owoade, F. Wuraola, O. Olasehinde, P.A. Akinyemi, K. Randolph, A.J. Dare, et al., Unveiling research training gaps in oncology: evaluating a research capacity-building effort among Nigerian physicians, *Niger. J. Clin. Pract.* 25 (2022) 1038–1045, https://doi.org/10.4103/njcp.njcp.1461_21.
- [16] S. Bayard, L. Susick, I. Kyei, Y. Chen, M.B. Davis, K. Gyan, et al., Brief report: global health initiatives and breast oncology capacity-building in Africa, *Am. J. Surg.* 219 (2020) 563–565, <https://doi.org/10.1016/j.amjsurg.2020.01.034>.
- [17] R. Zachariah, S. Rust, S.D. Berger, N. Guillermin, K. Bissell, P. Delaunoy, et al., Building global capacity for conducting operational research using the SORT IT model: where and who? *PLoS One* 11 (2016), e0160837 <https://doi.org/10.1371/journal.pone.0160837>.
- [18] A. Delamou, V. Tripathi, B.S. Camara, S. Sidibe, F.M. Grovogui, D. Kolie, et al., Capacity building in operational research on obstetric fistula: experience in the Democratic Republic of Congo, 2017–2021, *Int. J. Gynaecol. Obstet.* (2022), <https://doi.org/10.1002/ijgo.14377>.
- [19] Z. Hong, L. Li, L. Zhang, Q. Wang, J. Xu, S. Li, et al., Elimination of schistosomiasis japonica in China: from the one health perspective, *China CDC Wkly.* 4 (2022) 130–134, <https://doi.org/10.46234/ccdcw2022.024>.
- [20] Y. Liu, Z.Q. He, D. Wang, Y.B. Hu, D. Qian, C.Y. Yang, et al., One Health approach to improve the malaria elimination programme in Henan Province, *Adv. Parasitol.* 116 (2022) 153–186, <https://doi.org/10.1016/bs.apar.2022.02.001>.
- [21] D. Wang, P. Chaki, Y. Mlacha, T. Gavana, M.G. Michael, R. Khatibu, et al., Application of community-based and integrated strategy to reduce malaria disease burden in southern Tanzania: the study protocol of China-UK-Tanzania pilot project on malaria control, *Infect. Dis. Poverty* 8 (2019) 4, <https://doi.org/10.1186/s40249-018-0507-3>.
- [22] R.A. Khatib, P.P. Chaki, D.Q. Wang, Y.P. Mlacha, M.G. Mihayo, T. Gavana, et al., Epidemiological characterization of malaria in rural southern Tanzania following China-Tanzania pilot joint malaria control baseline survey, *Malar J* 17 (2018) 292, <https://doi.org/10.1186/s12936-018-2446-7>.
- [23] J. He, F. Kabole, Schistosomiasis Control Program in Zanzibar: An Overview. In: K. Yang, H. Mehlhorn. (eds) Sino-African Cooperation for Schistosomiasis Control in Zanzibar. Parasitology Res. Monogr. Springer, Cham, 15 (2021) 53–75, https://doi.org/10.1007/978-3-030-72165-7_4.