by conflicts, terrorism, insurgency, migration and internally displaced persons. Virtually all regions of the country are affected with the northeast bearing the highest burden. Every effort is needed to understand the dynamics of this issue in the effort to control and eliminate malaria [7].

In addition, lack of knowledge about the cause and control of malaria, misconceptions about the cause of malaria are reported in researches from the globe. A report by the federal ministry of health showed that residents of both urban and rural areas still have misconceptions about the cause of malaria. These are the major socio-cultural setbacks in malaria treatment and control. All these contribute to the discrepancies in health seeking behavior and may cause delay in seeking appropriate treatment [8].

Insecticide treated nets and their use, prevalence of mosquito net ownership varies greatly by residence and region. According to 2003 Nigeria demographic and health surveys (NDHS), only 12 % of households reported owing at least a net while 2 % of household report they own an Insecticide treated net (ITN). Similarly, in the 2008 (NDHS) data collected on measures to prevent malaria, it was shown that 17 % of household nationwide own at least a net of any type, while 8 % own at least an ITN. This shows that the ownership of mosquito nets is not wide spread in Nigeria [9]. Financial status also contributes to the less effective control and prevention of malaria in Nigeria. At the household level, poor housing exposes people to the contact with infective mosquitoes, as insecticide treated nets are unaffordable to the poorest if they must pay for them, and lack of resources prevent people from seeking timely health care. Studies have revealed that higher prevalence of malaria infections occurs among the poorest populations group and the poorest were the most susceptible to contracting malaria [10].

Conclusions

Much work still needs to be done to reduce malaria incidence to a minimum level in Nigeria. Presently, evidence base strategies and action are on its prevention, diagnosis, treatment, surveillance, research, and social mobilization. The advance in fight against malaria is largely due to the mass distribution of treated mosquito nets, especially the long lasting insecticide nets. The way out is making accessibility to affordable standard equipment and drugs. Epidemiological surveillance is an essential guide in control strategy. Vector control using barrier method like bed sheets, wearing protective clothes, using mosquito coils, insecticide, and improving general sanitation should be encouraged. Health workers should be trained on how to spray the various site and the surrounding environments, and more awareness and campaigns on fighting against malaria should be carried out. In addition, mass drug distribution should be encouraged especially in places like internal displaced people camp (IDP) and refugee camps. A major drug policy that will alter the treatment of malaria is one which was made by the Federal Government of Nigeria, which placed a ban on Chloroquine and Sulfadoxine — Pyrimethamine as first line drugs in the treatment of the malaria, replacing them with artemisinin-based combination therapy (ACT), and this has reduced the drug resistance to P.falciparum malaria At the moment there is no record of mass drug administration.

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YELLOW FEVER IN AFRICA: EPIDEMIOLOGY AND PREVENTING STRATEGIES

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Relevance

Yellow fever is an acute, viral infectious disease. It is caused by the yellow fever virus, a single-stranded RNA virus of the genus *Flavivirus*. It is mainly transmitted by the bite of an infected

female mosquito, usually *Aedes aegypti.* It causes damage to many organs including the liver, causing jaundice (hence the name 'yellow fever').

Yellow fever was transported during the slave trade in the 15th and 16th centuries from Africa to the Americas where the virus encountered favorable ecological conditions that allowed creation of a sustainable sylvatic cycle. Despite effective vector control and immunization programs for nearly a century, yellow fever epidemics reemerged in many Latin American countries, particularly Brazil. Yellow fever outbreaks occur if at least three conditions are fulfilled: the introduction of the virus into a non-immune human community, presence of competent and anthropophilic (preference of human host to animals) vectors and insufficiency of prevention and/or adequate management of the growing outbreak. There are 3 transmission cycles for yellow fever: sylvatic (jungle), Intermediate (savannah) and urban. On the other hand, two weapons are available to constrain yellow fever: vector control and immunization. Yellow fever is absent from Asia and the Pacific despite the presence of the vector in the area [1].

Purpose of the study

To review current epidemiological situation and preventing strategies of yellow fever in Africa.

Materials and research methods

An estimated 90 % of the infection occur on the African continent. It is endemic in 34 sub-Saharan countries.

In late 2012, a yellow fever outbreak occurred in the Darfur region of Sudan that was the largest yellow fever epidemic to strike Africa in two decades. On 10 January 2013, the Sudan Federal Ministry of Health and the World Heath Organization (WHO) reported that there had been 847 suspected cases since 2 September 2012, including 171 deaths, for an estimated case fatality rate of 20 %. A mass vaccination campaign was launched in mid-November. The vaccination campaign, from mid-November 2012 through early January 2013, covered more than 3 million people and halted the outbreak. By early January, the five states of Darfur were free of any new cases.A situation report released on 10 January 2013 reported that 171 people had died of the disease as of 9 January 2013. The number of suspected cases since 2 September 2012 was 847. The Minister of Health had announced on 5 January that no additional cases had appeared in the previous 3 weeks [2].

According to the WHO, in 2016, two linked urban yellow fever outbreaks — in Luanda (Angola) and Kinshasa (Democratic Republic of the Congo), with wider international exportation from Angola to other countries, including China — have shown that yellow fever poses a serious global threat requiring new strategic thinking [3].

Results and discussion

The first yellow fever cases, reported in the province of Luanda, had onset of symptoms in December 2015. Since then, cases have been reported in all 18 provinces of Angola; confirmed cases were reported in 14 provinces. As of 15 May 2016, the Angolan Ministry of Health (MoH) had notified 2 420 suspected yellow fever cases, 298 of which were fatal (CFR of 12 %). The highest number of suspected and confirmed cases were reported in February and March 2016, with a peak of notification at the end of February, when more than 80 confirmed cases per week were reported. From April, the number of new cases declined in Angola. In the two most affected provinces of Luanda and Huambo, it had decreased to an average of 30 cases per week. Overall, 70% of the cases were in males, with a large proportion of men between 15 and 30 years of age [4].

To stop the outbreak, Angola developed a National Response Plan and a total of 6.4 million people were targeted for yellow fever vaccination in the Province of Luanda. To date, 87 % of this target population has been vaccinated. A total of 7.355 million doses of yellow fever vaccines were made available with the support of WHO, the ICG (International Coordinating Group for yellow fever vaccine provision). Health partners, (including UNICEF, CDC/Atlanta, CORE Group, Médicins Sans Frontières, Medicos del Mundo, the National Red Cross of Angola, Religious organizations, the National Army, the National Police, other community-based organization National and international partners) continue their joint efforts to overcome the new challenges, including in the area of communication and social mobilization for creation of awareness [4].

On 14 September 2017, the Nigerian Centre for Disease Control (NCDC) informed WHO of a confirmed case of yellow fever in Kwara State. On 15 September, an official notification as per the

International Health Regulations (IHR) was issued by the Nigerian National IHR Focal Point. The case-patient was a 7 year-old girl from Kwara State who developed symptoms on 16 August 2017 including fever, vomiting and abdominal pain. She had no previous history of yellow fever vaccination and no travel history outside of the state in the two years prior to illness onset. Her blood sample tested positive by Polymerase Chain Reaction (PCR) at the Lagos University Teaching Hospital, and confirmed by serology tests performed at the regional reference laboratory, Institut Pasteur de Dakar (IPD). From 2 July through 19 December 2017, 341 suspected cases of yellow fever were reported from 16 states, including Abia, Anambra, Borno, Edo, Enugu, Kano, Katsina, Kogi, Kwara, Kebbi, Lagos, Nasarawa, Niger, Oyo, Plateau, and Zamfara states. Six states have reported confirmed cases of yellow fever (Kano, Kebbi, Kogi, Kwara, Nasarawa and Zamfara). As of 19 December, a total of 213 samples had been tested in five laboratories in Nigeria. Of these 213 samples, the Nigerian laboratories tested 63 samples positive for yellow fever and there was one inconclusive result. Of 63 samples sent to IPD for laboratory confirmation of yellow fever infection, 32 were positive. Of the 341 suspected cases, 214 (62.8 %) were males. The most affected age group was people aged 20 years and younger who accounted for 65.9 % of cases. The total number of deaths (among suspected, probable and confirmed cases) was 45 and nine among the confirmed cases. The case fatality rate for all cases (including suspected, probable and confirmed) was 21.1 and 28.1 % for confirmed cases [5].

Routine yellow fever vaccination was introduced to Nigeria's Expanded Program on Immunization (EPI) in 2004, but the overall population immunity in areas affected by the current outbreak likely remains below 60–80 %. Reactive vaccination campaigns targeting more than 800 000 people aged 9 months to 45 years in priority communities of Kwara and Kogi states in October 2017 increased the coverage to 98 % in targeted areas. From 18 September through 20 October 2017, rapid response teams (including epidemiologists and entomologists) from NCDC and WHO were deployed to support local authorities investigate this event further in Kwara, Kogi, and Plateau states, to assess the risk of further spread, and to assist in conducting reactive vaccination campaigns, among other activities. Additionally, a pre-emptive mass campaign is planned to begin in February 2018 to combat and prevent future outbreaks [5]. To further prevent outbreaks in Nigeria, the CDC recommends the Yellow Fever vaccine for all travelers who are 9 months of age or older. The government of Nigeria also requires proof of yellow fever vaccination if you are traveling from a country with risk of yellow fever [6]. The Eliminate Yellow Fever Epidemics (EYE) Strategy was developed by the WHO to respond to the increased threat of yellow fever urban outbreaks with international spread. The global EYE Strategy is guided by three strategic objectives: to protect at-risk populations, prevent international spread of yellow fever and to contain outbreaks rapidly. These objectives are supported by the success of the following:

1) affordable vaccines and sustained vaccine market;
2) strong political commitment at global, regional and country levels;
3) high-level governance with long-term partnerships;
4) synergies with other health programs and sectors;
5) research and development for better tools and practices [7].

In addition to vaccination, other methods of prevention such as mosquito protection by use of both skin and non-skin repellant, fully covering up when going into mosquito infested areas, use of bed nets that have been treated with insecticides and avoiding unnecessary outdoor activities in mosquito infested areas; have been recommended by the WHO and Red Cross organization in order to prevent outbreaks in endemic countries.

There is currently a limited arsenal of safe, efficient and cost-effective insecticides that can be used against adult vectors. This is mainly due to the resistance of major vectors (eg A. aegypti) to common insecticides and the withdrawal or abandonment of some kind of pesticides for reasons of safety. There have been rare reports of serious side-effects from the yellow fever vaccine. The rates for these severe 'adverse events following immunization' (AEFI), when the vaccine provokes an attack on the liver, the kidneys or on the nervous system are between 0 and 0.21 cases per 10 000 doses in regions where yellow fever is endemic, and from 0.09 to 0.4 cases per 10 000 doses in populations not exposed to the virus. The risk of AEFI is higher for people over 60 years of age and anyone with severe immunodefi-

ciency due to symptomatic HIV/AIDS or other causes, or who have a thymus disorder. People over 60 years of age should be given the vaccine after a careful risk-benefit assessment [3].

Conclusions

Yellow fever vaccines is now recommended as routine immunization in countries where it is very common. It is safe and affordable and readily distributed in endemic countries.

To also guarantee a rapid and effective response to outbreaks, an emergency stockpile of 6 million doses of yellow fever vaccine, funded by Gavi, is continually replenished. This emergency stockpile is managed by the International Coordinating Group for Vaccine Provision, for which WHO serves as secretariat. It is expected that by the end of 2026, more than 1 billion people will be protected against yellow fever through vaccination.

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THE EPIDEMIOLOGY OF TYPHOIDAL SALMONELLA INFECTIONS IN REGIONS OF ENDEMICITY

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Relevance

Salmonella enterica is one of the leading causes of community-acquired bloodstream infections in many low- and middle-income countries. Salmonella enterica serovars Typhi, Paratyphi A, Paratyphi B, and Paratyphi C may be referred to collectively as typhoidal Salmonella, whereas other serovars are grouped as nontyphoidal Salmonella (NTS). Typhoidal Salmonella strains are human host-restricted organisms that cause typhoid fever and paratyphoid fever, together referred to as enteric fever. NTS strains may infect or colonize a broad range of vertebrate animals, or may be adapted or restricted to particular nonhuman animal species [1].

Purpose of the study

To review the epidemiology of typhoidal salmonella infections, highlighting possible changes over the years in regions of endemicity and newer measures in prevention and management.

Materials and research methods

Reviews, analysis, data processing of domestic and foreign literature on typhoidal salmonella infections and possible changes in its epidemiology over the years in endemic regions.

Results and discussion

Epidemiology of typhoidal Salmonella. Enteric fever is usually prevalent in overcrowded and poor countries. Regions of Africa, Southeast Asia have been said to be high risk areas. Other regions of Asia and Africa, some parts of Latin America, the Caribbean, and Oceania have a medium incidence of 10 to 100 cases per 100,000 person-years. An estimated 17 million cases of typhoid and paratyphoid fever illnesses occurred globally in 2015,3 mostly in South Asia, Southeast Asia, and sub-Saharan Africa, with both the largest burden and incidence occurring in South Asia. Modeled estimates from the 2015 Global Burden of Disease study (GBD 2015) showed typhoid fever incidence rates decreasing as age increased [2]. Left untreated, both typhoid and paratyphoid fever may be fatal with 178,000 deaths estimated worldwide in 2015 [2, 3]. Patients in endemic areas are usually school aged children or adolescents, and it affects both sexes equally.