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Schistosomiasis control: moroccan experience compared to other endemic countries

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PEER REVIEW

Peer reviewer

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This good review has treated the main interventions goals in schistosomiasis control strategies and given some example of countries which have accomplished control strategy with success. It is an interesting paper which gives a clear idea for all efforts done by an ex endemic country like Morocco to control schistosomiasis

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ABSTRACT

Schistosomiasis or bilharzia is a tropical parasitic disease known as a water-borne trematode infection. It is really regarded as a world health problem because it infects individuals from 76 various countries, particularly in tropical and subtropical areas. Recent times have observed a significant decrease/drop in the prevalence and morbidity of the illness in a lot of these endemic countries. In Egypt, the prevalence was declined from 40% in 1967 to <3% in 2006 after the national control program started. Over a long period of time, Morocco was endemic for schistosome infection. In 1973, Morocco made a decision to develop an approach to control and then to eliminate schistosomiasis by means of three main phases (control, elimination and after that consolidation). From 2004 to now, it isn't declared any new indigenous case. Morocco accomplishes the mission and consequently succeeds in reducing the prevalence of infection to a level of absolutely zero, therefore eliminating schistosomiasis all over the endemic geographic regions.

KEYWORDS

Schistosomiasis control, Elimination, Morocco

1. Introduction

Schistosomiasis or bilharzia is a tropical parasitic disease known as a water-borne trematode infection which is endemic in 76 countries, 46 of which are in Africa. Almost 207 million people are affected worldwide with 120 million people developing symptoms, 20 million of them are severely ill[1-5]. Schistosomiasis remains to be truly neglected in some countries because of the close link with poverty, stigmatization, lack of political voice of infected people and the deficiency in a developed

global financing system[6,7].

Schistosomiasis has been considered to be endemic in 14 of the 23 countries of the Eastern Mediterranean region since a long period. Recent times have observed a significant decrease/drop in the prevalence and morbidity of the illness in a lot of these endemic countries. For example, the total prevalence of the disease in Egypt was approximated to be about 40% in 1967 before the national control program started. In 2006, as a result of the application of different control measures, the overall prevalence declined to <3%.

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Consequently, deficiency of sustainability of well-structured prevention/control/elimination programs might result in emergence or resurgence of the controlled disease. In general, emergence or resurgence of schistosomiasis may be a result of change in public health policy, demographic and societal changes, and diversion of financial support. The China experience is certainly a good practical example showing that relaxation of control measures consequent to achieving a success could lead to resurgence of the disease[8].

Schistosomiasis control strategies needs to be founded on four main goals for interventions: 1) acting on adult worm by screening for affected people and treating them by chemotherapy; 2) eliminating intermediate host “snail” by biological or chemical control and environmental management; 3) preventing water contamination by using people information, education and communication (IEC); 4) prevention of human contamination by using IEC, sanitation and hygiene (Figure 1).

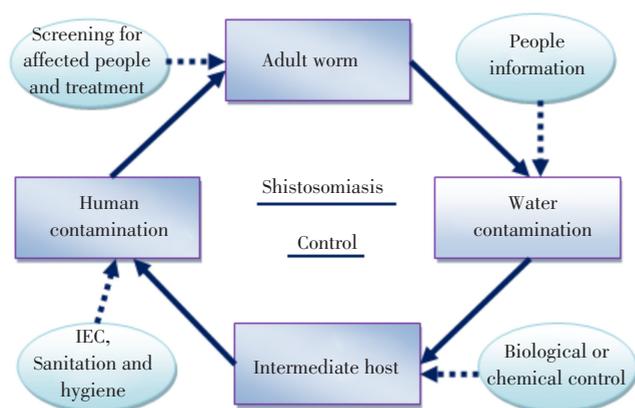


Figure 1. Main interventions goals in Schistosomiasis control strategies.

The optimal purpose of each schistosomiasis intervention effort is expected to be the elimination of this disease[9]. Elimination is actually achieved in several epidemiological locations and control progress in numerous endemic regions which are nowadays in the position to work for elimination once they have successfully reduced morbidity concerning schistosome infections. Recognition of the public health effects of schistosomiasis, political will and motivation, as well as continual application of the established national control programs accomplished successfully wherever followed as in Brazil, China, and Egypt[10,11]. In this brief article, we will require the example of Morocco to show the efforts of responsible authorities in combination with World Health Organization to deal with and eliminate schistosomiasis and to achieve the objectives drawn via different programs.

2. Discussion

Schistosomiasis had been endemic to rural zones in Southern Morocco for a lot of years, and the initial cases were diagnosed in 1914[12]. Urinary schistosomiasis is the main form of schistosomiasis in Morocco caused by *Schistosoma haematobium*[13]. Throughout the last three decades, the progression of irrigation generated the spread of the disease, transmitted by *Bulinus truncatus*, to the north and center of the country resulting in ecologically different endemic foci: oases and arid areas, periodical streams in mountainous areas, modern irrigation strategies, coastal plains, swamps and also rivers[8].

The epidemiological situation of the infection was seen as an alarming in 1973 event (13 416 cases), which pushed, three years later, the Ministry of Health to focus on a national control program. This program was introduced in 1976 by means of a preparatory phase which lasted three years (1977–1981), and thereafter a test phase in three pilot provinces[14].

The preparatory phase designed for defining an adequate strategy and operational approach to develop the national control program, and not really until 1982 that it eventually became operational in all provinces vulnerable to disease transmission[15].

The operational phase throughout the years 1982–1993, in which the adopted strategy designed to control morbidity, infection and transmission via: case–detection [selective passive detection, selective active detection, exhaustive detection, mass screening; malacological observation (snail monitoring, mollusciciding); chemotherapy (individual and mass treatment) and health education][16]. Following the introduction and extended of the program in all provinces vulnerable, the number of cases reduced from 6 582 in 1982 to 3 887 in 1989, with a peak of 10 645 cases during 1983[17].

The epidemiological situation of the disease characterized by favorable evolution was basically due in huge part to the continuous actions of the control program, improved in 1987 through the introduction of praziquantel, very efficient drug and administered just as a single dose. By the end of 1992, some foci of transmission were absolutely inactivated; others became greatly under control and also prevalence was progressively decreased. In 1993, a schistosomiasis elimination program had been developed[16].

The elimination phase has been initiated since 1994; the objective is to reinforce the effort to eliminate almost all disease transmission foci at the finish of 2004. It is

founded on improving case–detection inside of high–risk areas; offering treatment of all diagnosed cases and wide coverage in case of mass chemotherapy; extending snail surveillance and mollusciciding everywhere it is necessary; supporting health education; generating intersectoral action and improving intersectoral coordination; encouraging community participation[16]. Furthermore, there was monitoring as well as continual evaluation of the efficiency of the interventions. Parasitological surveillance was intensive with 149 718 samples being analyzed in 2000, 130 826 in 2004 and 90 470 in 2006[8].

Since 2005, the program moved into in the consolidation phase, which will prolong until 2010. This has been characterized by: 1) maintenance of the surveillance activities with a purpose of detection in previous endemic locations and schools (children under 10 years of age enrolled or non–enrolled) to determine replaced transmission; 2) epidemiological surveys close to this sort of cases and mass treatment; 3) continuous surveillance of water bodies (323 water bodies were analyzed in 2006) as well as control of snail hosts[8].

Since the beginning of the schistosomiasis elimination program, the number of cases regarding schistosomiasis in Morocco has been progressively reduced. In 1999, 231 cases were noted, of which 83% reported in four provinces, and in 2002 this figure was decreased to 42 cases. No indigenous case was noticed in the country since 2004[15].

Throughout the period of 2005–2009, epidemiologic observations explained that there was an interruption of transmission at the national level. No active focus of transmission was observed. Only 13 and 4 sporadic cases were found in 2005 and 2006, respectively. Epidemiologic investigations established around these cases declared that 9 cases were imported, and 8 cases were residual cases[12].

A systematic serologic survey was established by Amarir *et al.* to evaluate the transmission status in remaining disease–endemic foci[12]. This study concerns the population of 2 382 children born after the date of the last autochthonous cases. These cases were selected from provinces with histories of high schistosomiasis transmission (Tata, Chtouka Ait Baha, Errachidia, El Kelaa Des Sraghna, and Beni Mellal). The results revealed an absence of antibodies in all serum samples. This finding confirms either a low transmission status or an interruption of schistosomiasis transmission within the last disease endemic foci[12].

The epidemiological situation of schistosomiasis in 2010

was indicated by control of the situation at all foci, no cases from active transmission have been diagnosed for the 6th consecutive year. The ministry mentioned just the detection of imported case from Mauritania and a residual case native of Taroudant[18]. In 2012, no indigenous or imported case was reported[19].

We could admit that Moroccan strategy was founded on three major phases which are control phase, eliminating phase and consolidation phase. The course of the Moroccan strategy is summarized in Figure 2. The continual survey after elimination is necessary to prevent the emergence or resurgence of schistosomiasis in every endemic country which has accomplished the elimination program with success.

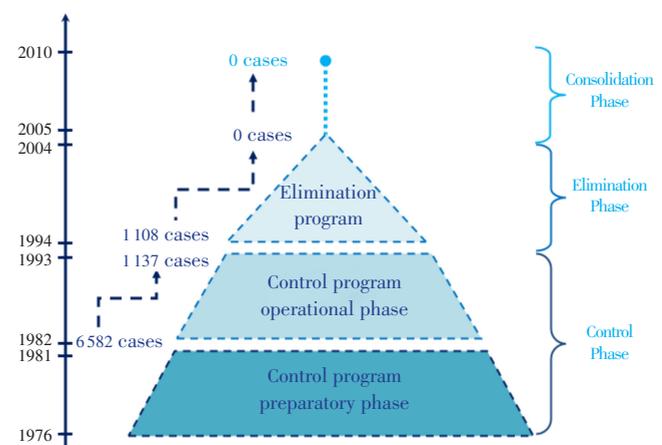


Figure 2. The three major phases of Moroccan strategy control.

Conflict of interest statement

We declare that we have no conflict of interest.

Comments

Background

Schistosomiasis or bilharzia is a tropical parasitic disease infection which is endemic in 76 countries. Recent times have observed a significant decrease/drop in the prevalence and morbidity of the illness in a lot of these endemic countries. Schistosomiasis had been endemic to rural zones in Southern Morocco for a lot of years. Urinary schistosomiasis is the main form of schistosomiasis in Morocco caused by *Schistosoma haematobium*. After control strategy started in 1973, Morocco succeeds in reducing the prevalence of infection to a level of absolutely zero, therefore eliminating schistosomiasis all over the endemic geographic regions.

Research frontiers

This review was based on demonstrating the different steps of strategy control that are established by Morocco to deal with and to eliminate schistosomiasis. This strategy control was founded on three major phases which are control phase, eliminating phase and consolidation phase.

Related reports

The interruption of transmission of schistosomiasis in provinces with histories of high schistosomiasis transmission was confirmed by the study of Amarir *et al.*

Innovations & breakthroughs

The review of the Moroccan experience in schistosomiasis control has shown with success the course of schistosomiasis control strategy in Morocco and especially how it is illustrated in pyramid figure.

Applications

The Moroccan experience should be taken like a good example for all endemic countries which are not yet able to control schistosomiasis.

Peer review

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