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Review

Prevalence of urinary schistosomiasis in Nigeria, 1994–2015: Systematic review and meta-analysis

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Abstract

Introduction: The Global significance of schistosomiasis started waning over the years owing to its eradication in most developed societies, until the reawaking of global attention and it now occupies a prominent place amongst the neglected tropical diseases (NTD). The aim of our study was to accurately estimate the prevalence of schistosomiasis in Nigeria, and its six geo-political zones.

Subjects and methods: We utilized electronic databases to search and select studies on prevalence across the geographical zones between 1994 and 2015. STATA 10 Random effects meta-analysis of observational studies was used to generate our estimates.

Result: Sixty-seven studies met the inclusion criteria. The unified pooled population studied was 47,440 (n = 14,888 persons). The pooled prevalence]) of Schistosoma haematobium infestation was, for all regions = 34.7% (31.0–38.5) (95% confidence interval [CI]).

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Conclusion: Schistosomal infestations remain hyperendemic in Nigeria. Nigeria must, therefore, expedite the execution of resolution WHA66.12 adopted by the World Health Assembly on NTD.

Introduction

Despite the gains in the health care delivery of the past decades, schistosomiasis has prevailed as a health challenge in the tropic and the subtropics [1]. According to the World Health Organisation (WHO), schistosomiasis is second to malaria alone amid the vector-borne diseases in terms of public health and remuneration importance in the tropics [2]. In 2013, more than 62 million persons representing greater than 39% of those requiring preventive chemotherapy in the top ten African countries with the highest prevalence of the disease are Nigerians; of these less than 6% had the preventive chemotherapy [3]. This increased to greater than 64 million in 2014 [4]. Another study suggested Nigeria had the highest schistosomiasis burden in the world [5,6]. Akinwale et al. using PCR technique reported startling 98.4% prevalence in a local community in the southwestern Nigeria among the age group 6–63 years [7]. Urinary schistosomiasis is a risk factor for the second most common urologic malignancy (bladder cancer) and myriads of disorders that result in morbidity and mortality [8–10]. Schistosomiasis infestations additionally result in poor physical and psychosocial development among the school-aged children and adolescents [11]. Furthermore, a study had shown that control of schistosomiasis may be more cost-effective compared to current measures in curtailing the HIV spread among Africans [12]. The prevalence and these public health aftermaths of schistosomiasis with other neglected tropical disease necessitated the ratification of resolution 66.12 in 2013 by World Health Assembly [13]; the intent was curtailing the problem common in 78 countries and affecting more than 200 million people [14]. Nonetheless, in Nigeria many governmental, and non-governmental bodies have devoted resources aimed at prevention and controlling schistosomiasis. These endeavors incorporated community reawakening on the inherent imperils of untreated childhood haematuria; numerous community screening with the computation of the populace prevalence, and the provision of free mass drug treatment in communities with high endemicity [15–18]. However, it is onerous to objectively affirm if the efforts are effective since the current prevalence is unknown for the country and its sub-regions. Hence, the aim of our studies was to accurately estimate the current prevalence of urinary schistosomiasis in the country and the six geopolitical subregions.

Subjects and methods

We did a systematic review and Meta-analysis of observational studies in epidemiology (MOOSE) guideline [19]. We searched for the articles on the prevalence of schistosomiasis in the relevant international databases, including PubMed, ISI, Google Scholar, Scopus and African journal online (AJOL), from 1994 to 2015. This search was completed on 24th March 2016. In search of gray articles, we reviewed non-indexed Nigerian journals and also contacted experts in the field for other articles we might miss. The keywords for the research were: "prevalence","incidence", "schistosomiasis", "Bilharziasis", "Nigeria" and the sub-region with the states were crossed in the search.

We attempted to minimize the risk of bias, by assigning six reviewers to independently search reviews and merge selected studies that we used in the final summary of included articles. The reference lists of the articles obtained were then reviewed to find other eligible studies. The inclusion criteria included: study done in Nigeria, study design been cross-sectional, parasitological identification of schistosome ova in the urine; and a sample size of at least 100 persons; studies were included if they were published in English between 1994–2015. No age limitation was proffered. The only exclusion criterion was articles written in languages other than English. Age group categorization was done as follows; children were designated as those of 12 years of age and below; adolescent 13–17 years; and adult 18 years or higher. The study quality was evaluated by 12-points scoring system established upon the Down and Black checklist [88].

In the second phase, all the articles identified were independently reviewed by three investigators; favorable studies were summarized and incorporated for the meta-analysis.

The primary outcome measured was the prevalence of schistosomiasis, the standard error of prevalence was determined by the binomial probability distribution. Between-study heterogeneity was evaluated using the Cochran test and I^2 test. The level of significance for the Cochran test was set as 0.05. I^2 values near 25% indicate low heterogeneity, values near 50% show moderate heterogeneity, and those above 75% show high heterogeneity. Random effect model with DerSimonian–Laird method was utilized for estimation of pooled measures by calculating the pooled estimate and confidence intervals, based on the weighted least square (weighting is given by the reciprocal sum of between and within study variances) [20].

Publication bias was appraised by a funnel plot and Begg's as well as Egger's regression tests. All analysis was performed using STATA software (version 10).

Results

Our search yielded an initial 359 reviews. After screening and assessment for eligibility of the studies; ultimately, sixty-seven cross-sectional studies were selected and used for the final analysis as shown in table of summaries of the included studies (Table 1) [21–88] and flow diagram of the studies included in the review (Fig. 1).

Overall prevalence

The prevalence of urinary schistosomiasis infestation in Nigeria varied from 2% to 82.5% amidst analyzed studies. The pooled prevalence measure for Nigeria was 34.7% (95% confidence interval