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LETTER TO THE EDITOR

The hidden epidemic of schistosomiasis in recent African immigrants and asylum seekers to Italy

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Abstract The prevalence of schistosomiasis among recent refugees from sub-Saharan Africa in Italy is unknown. This is a retrospective review of African immigrants screened at Centre for Tropical Diseases of Negrar from March 2014 to February 2016. Of the 373 immigrants tested, 34% were positive at least at one schistosomiasis test. The proportion of positive ELISA serology was 103/373 (27.6%). At microscopy, infected subjects were 65/373 (17.4%), (51% *Schistosoma haematobium,* 38% *Schistosoma mansoni*, 11% both). CCA antigen for *S. mansoni* was positive in 47/373 individuals (12.6%). We found a particularly high positivity rate in subjects from Mali (72.1%) and Ivory Coast (48%). This "hidden epidemic" of schistosomiasis cannot be longer neglected, considering the risk of severe complications, and the effective and inexpensive treatment available.

Keywords Schistosomiasis · Immigrants · Refugees · Infectious diseases screening · Europe · Africa

Intestinal and urinary schistosomiasis, caused by *Schistosoma mansoni* and *Schistosoma haematobium*, respectively, are among the major neglected tropical diseases, especially, albeit not exclusively, affecting sub-Saharan African countries [1].

Starting with 2014, a huge wave of (mostly young) immigrants and refugees from that area have reached Italy, usually after surviving a perilous journey from their native country through the desert and then the Mediterranean sea [2].

The health care of newly arrived immigrants and refugees is usually limited to a clinical assessment especially aimed at detecting potentially transmissible diseases such as tuberculosis and scabies. Neglected parasitic diseases, lacking a local transmission potential, and often clinically silent, are not routinely screened.

At the Centre for Tropical Diseases (CTD), that is a referral centre for tropical diseases in Italy, immigrants are referred for a more comprehensive screening from the following main sources: Centro Salute per Immigrati (CESAIM), an outpatient service managed by medical volunteers in Verona, through a formal agreement with the local Public Health unit, and a few sites in the province of Verona hosting the recently arrived asylum seekers through an agreement with the Italian Home Office.

All immigrants referred for parasitologic screening to CTD are submitted to microscopy of three faecal samples after formol-ether concentration and to routine serologies. Moreover, if epidemiologically consistent, they are also submitted to urine microscopy after micropore filtration for *S. haematobium*, to the rapid, circulating cathodic antigen (CCA) urine dipstick test for *S. mansoni* (NADAL CCA Bilharzia test, nal von minden, Germany), and to serologic testing (enzyme-linked immunosorbent assay, ELISA Bordier Affinity Products, Crissier, Switzerland) containing *S. mansoni* soluble antigens to detect levels of immunoglobulin G. According to the manufacturer's instructions, the result of ELISA is positive when the absorbance of the analyzed sample is higher than the absorbance of the weak positive control (supplied with the kit). We defined as positive samples those with: optical density (OD) of study sample/OD of weak positive

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control ≥1 (normalized OD). Informed consent was obtained from all individual partecipants included in the study.

We retrospectively retrieved from the CTD database the clinical records of all African immigrants and refugees submitted to microscopy, serology (ELISA) and urinary antigenic test CCA for schistosome from 13 March, 2014 to 23 February, 2016.

Overall, 373 subjects (87% male) were included in the present study. The median age was 25 years (IQ range 20–31). Individuals with at least one positive schistosoma test were 128/373 (34.3%). The proportion of positive ELISA serology was 103/373 (27.6%). At microscopy, infected subjects were 65/373 (17.4%), of which, 33/65 (51%) had *S. haematobium* eggs only, 25/65 (38%) had *S. mansoni* eggs only, and 7/65 (11%) had eggs of both species. Most of the microscopically positive subjects had light to medium intensity infections (29/32 or 91% for *S. mansoni* and 36/40 or 90% for *S. haematobium*). CCA antigen for *S. mansoni* was positive in 47/373 individuals (12.6%).

In relation to the countries of origin (considering only countries with at least 10 individuals screened), nationals of Mali were the group with the highest proportion of positive results (24/43 or 56%, 19/43 or 44%, and 9/43 or 21%, for serology, microscopy and CCA, respectively), closely followed by Ivory Coast (11/25 or 44%, 11/25 or 44%, and 7/25 or 28%) (Table 1).

Although this was not a community-based epidemiologic study, as subjects were tested at a referral centre, nevertheless they were referred for routine screening and not because of clinical manifestations, and thus they may be considered as reasonably representative of the immigrant/refugee population coming from the same countries.

The estimated prevalence in this African population of recent immigrants and (mostly) asylum seekers ranged from 17% if based on microscopy (that is known to have a low sensitivity) to 13% and 28% if based on CCA and ELISA, respectively. The latter tests may give a variable proportion of false positive results one side, and are poorly sensitive for *S. haematobium* on the other, as they are both specifically targeted for *S. mansoni* [1]. Serological IgG antibody assay cannot distinguish active infection from past exposure, although none of the study subjects reported a previous treatment for schistosomiasis.

Given these limitations, even the lowest estimate based on microscopy indicates that the prevalence of schistosomiasis in this recent, African immigration wave is strikingly high comparing with previous periods analysed elsewhere [3]. This is confirmed by a recent German study that found a schistosomiasis seroprevalence of 24.7% in 194 newly-arrived unaccompanied minor refugees from sub-Saharan Africa [4].

This "hidden epidemic" of schistosomiasis cannot be longer neglected, considering the risk of severe complications related to the two parasites, and the effective and inexpensive treatment available [1].

We also need to consider that the risk of reinfection, unfortunately common in African countries, is lacking in non-endemic countries. Thus, ethical reasons vis-a-vis this vulnerable population impose to consider schistosomiasis as a public health problem.

Moreover, although this is not a directly transmissible disease, the recent (and possibly not yet concluded) outbreak of urinary schistosomiasis in Corsica is a useful reminder that local transmission in Europe is still possible [5] and that in the global village no health problem can be dismissed as concerning "the others". Not surprisingly, Corsica outbreak was originated by a West African strain [5], and immigrants from two West African countries were those with the highest proportion of positive results in our series, approaching 50% even considering microscopy alone.

In Italy, only considering asylum seekers, 9692 came from Mali in 2014 and 5455 in 2015, while 1485 and 3115, respectively, came from Ivory Coast (http://www.interno.gov.it/sites/default/files/modulistica/riepilogo_dati_2014_2015.pdf). This means several thousand infections from *S. mansoni*, *S. haematobium* or both (even considering the two countries only), of which almost all remain undiagnosed and are left without treatment. The country of

Table 1 Results of the test according to the country of origin of sub-Saharan immigrants

Country of origin	Number of patients tested	Antibodies detection (ELISA)	Ova detection (microscopy)	Schistosoma Antigen detection (CCA)	At least one positive test
Mali	43	24 (55.8%)	19 (44.2%)	9 (20.9%)	31 (72.1%)
Ivory Coast	25	11 (44%)	11 (44%)	7 (28%)	12 (48%)
Senegal	38	13 (34.2%)	7 (18.4%)	5 (13.2%)	15 (39.5%)
Ghana	47	13 (27.7%)	7 (14.9%)	7 (14.9%)	18 (38.3%)
Gambia	30	4 (13.3%)	3 (10%)	5 (16.7%)	7 (23.3%)
Somalia	13	1 (7.7%)	1 (7.7%)	2 (15.4%)	3 (23.1%)
Nigeria	104	11 (10.6%)	6 (5.8%)	5 (4.8%)	15 (14.4%)

origin of the study subjects (Table 1) is reported as a general indication. It may well be possible that some of them acquired the infection elsewhere, during their migration.

In order to get a more reliable picture of the prevalence of both infections, and to propose an effective screening strategy, we are planning to analyze the accuracy of different diagnostic tests, including a recently developed, commercially available RDT for serum antibody detection and an equally available Western Blot (both targeting *S. haematobium* as well as *S. mansoni*). Eventually, the cost-effectiveness of a screening strategy will have to be compared to that of a presumptive treatment. Either option is preferable to the current lack of any action.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval For this type of study formal consent is not required.

References

1. Colley DG, Bustinduy AL, Secor WE, King CH. Human schistosomiasis. Lancet. 2014;383:2253–64.
2. Trovato A, Reid A, Takarinda KC, Decroo T, Owiti P, Bongiorno F, et al. Dangerous crossing: demographic and clinical features of rescued sea migrants seen in 2014 at an outpatient clinic at Augusta Harbor, Italy. Confl Health. 2016;10:14.
3. Serre Delcor N, Maruri BT, Arandes AS, Guiu IC, Essadik HO, Soley ME, et al. Infectious diseases in Sub-Saharan Immigrants to Spain. Am J Trop Med Hyg. 2016;94:750–6.
4. Theuring S, Friedrich-Jänicke B, Pörtner K, Trebesch I, Durst A, Dieckmann S, et al. Screening in infectious diseases among unaccompanied minor refugees in Berlin, 2014–2015. Eur J Epidemiol. 2016;31:707–10.
5. Boissier J, Grech-Angelini S, Webster BL, Allienne JF, Huyse T, Mas-Coma S, et al. Outbreak of urogenital schistosomiasis in Corsica (France): an epidemiological case study. Lancet Infect Dis. 2016;16:971–9.