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Transmission of *Schistosoma mansoni* in New Halfa Scheme, Kassala State, Sudan

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ABSTRACT:

The objective of this study is to provide the basic microepidemiological and microecological information of Bilharzia from New Halfa Scheme that might enable a real and meaningful intervention. Concerning the microepidemiological part of the study, the achievement of the objective was attained through two parasitological surveys, one year spaced, for four selected residential sites in the scheme. In these two villages and two camps, 50% of the inhabitants were randomly selected and all school children of the four residential sites were included in the study. A pre-tested questionnaire was conducted for collection of the basic family information and the baseline data of the socioeconomics and practices related to perpetuation of the disease. Some accessible interventional techniques were conducted and their efficacy was assessed, reflected in knocking down the infection parameters.

Regarding the microecological part of the investigation, field observations were conducted on monthly basis, for a year, to assess the snails' population dynamics as well as the abundant macrofaunal forms in two canals of the scheme. Their monthly fluctuation was related to the observed aquatic ecological variables *e.g.* water temperature, speed, turbidity and depth, vegetation cover, as well as the abundant
natural enemies and competitors. From the other side, an array of laboratory experiments were designed and conducted to determine the most risky time for man to acquire infection, considering both naturally and laboratory infected snails. All obtained data were coded entered and analysed utilising a microcomputer and the relevant technique of the Statistix statistical packages.

The overall prevalence of the intestinal schistosomiasis among the school children in the study area was 54.6%, while the intensity was 80.6 eggs per gram. On the other side, the overall infection parameters of the villagers were 41.8% and 79.4 eggs per gram, respectively. Most of the infected candidates had light or moderate infection, while a very small proportion of the villagers and schoolchildren had heavy infection. The overall infection parameters varied with gender and age-classes, where the males significantly outnumbered the females and the infection peaked at the age-group (15-19) years. On the other side, the two infection parameters among the school children overrode those of the villagers, where the farmers and the agricultural labourers scored the highest prevalence rates. These findings were expounded on the basis of the socioeconomic status and water-contact activities, which were systematically observed during this study.

The adopted interventional approaches were chemotherapy and health educational programmes that concentrated on acquiring better habitats utilizing the religious message as an entry-point. The overall reduction among the villagers was 62.2%, where the reductions among the males and the female were almost equi-distributed, 65.4% and 60.2%, respectively. From the other side, the overall knockdown of the infection among the children was 76.3%. Considering the gender reduction among the school children, the infection rates of the males were declined by 78.1% while those of the females reduced by 65.6%, respectively.
The systematic observations of the water-contacts in two minor canals suggested a concomitant peak with the infection parameters among age-group of (15-19) years of both males and females. Swimming represented 50% of the important water-contact and no females were observed to practice any important water-contacts in the two minor canals. The monthly malacological surveys ensured that *Biomphalaria pfeifferi* snails were abundant in the observed waterbodies during the hot season (March-June) with a peak in May. The relative abundance of the macroaquatic forms was significantly dominated by *Biomphalaria* snails followed by the shrimps, *Cyprinus* fish and the dragonfly nymphs. The local strain of *Biom. pfeifferi* was proved in the laboratory to be highly susceptible to the local *S. mansoni* strain. In all natural and laboratory infected snails, the cercariae emergence began around 7:00 AM and peaked at 01-03 PM, then sharply declined at 7:00 PM. Finally - based on the findings of the investigation, some effective measures for combating the disease were highly recommended.