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A REVIEW ON PREVALENCE OF HUMAN SCHISTOSOMIASIS AND ASSOCIATED RISK FACTORS AMONG FISHERMEN AND FISH PROCESSORS

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Abstract

Schistosomiasis is a parasitic disease of humans that is caused by trematode flatworms of the genus Schistosoma that infect the host via water contact, especially in underdeveloped areas with limited access to sanitary facilities. A number of schistosome species, including *S. mansoni, S. haematobium, S. japonicum, S. mekongi, S. guineensis, and S. intercalatum*, are known to cause human schistosomiasis, which has two main forms: urogenital and intestinal schistosomiasis. The transmission of schistosomiasis is controlled by broader social elements over and above the biological life cycle, with interactions between the factors dictating vulnerability to schistosomiasis. Poor sanitation and hygiene, the practice of eating raw vegetables and failing to wash one's hands before eating, a lack of access to safe water, open defecation, taking a bath, fishing, washing of clothes, and inadequate access to medical care can all contribute to the development of severe schistosomiasis in people. However, it is also considered a high-risk area for schistosomiasis infection due to the daily activities of the fishermen, who often engage in activities such as bathing, swimming, and washing clothes in the water bodies. Furthermore, the lack of public latrines nearby leads to some fishermen and fish processors easing themselves in open fields near lake shores, putting them at even higher risk.

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Introduction:-

According to WHO (2022), schistosomiasis is a parasitic disease of humans that is caused by trematode flatworms of the genus Schistosoma that infect the host via water contact, especially in underdeveloped areas with limited access to sanitary facilities. A number of schistosome species, including *S. mansoni, S. haematobium, S. japonicum, S. mekongi, S. guineensis, and S. intercalatum*, are known to cause human schistosomiasis, which has two main forms: urogenital and intestinal schistosomiasis (Hailegebriel *et al.*, 2020; Tian‐ Bi *et al.*, 2019; WHO, 2022).

More than 240 million people are thought to be affected with schistosomiasis worldwide, and 700–800 million people are thought to be at risk of contracting the disease (Aula *et al.*, 2021). Sub-Saharan Africa accounts for 93

percent of the world's cases of schistosomiasis, with Nigeria (29 million) and Tanzania (19 million) having the highest numbers. The Democratic Republic of the Congo and Ghana each contribute 15 million cases to the burden of the disease globally. Schistosome infections and the development of disease-related complications are responsible for about 280,000 deaths annually (Aula *et al.*, 2021; Mawa *et al.*, 2021).

According to Mcmanus *et al.* (2018) and Nelwan (2019), the transmission of schistosomiasis is controlled by broader social elements over and above the biological life cycle, with interactions between the factors dictating vulnerability to schistosomiasis. Abe *et al.* (2018); Stensgaard *et al.*,(2018) and Joof *et al.* (2021) note that two genera of snails, *Bulinus*sppand *Biomphalaria*spp are in charge of dispersing the schistosomes *S. haematobium* and *S. mansoni*, which are the main causes of African schistosomiasis, respectively.

According to M'Bra *et al.* (2018), poor sanitation and hygiene, the practice of eating raw vegetables and failing to wash one's hands before eating, a lack of access to safe water, open defecation, taking a bath, fishing, washing of clothes, and inadequate access to medical care can all contribute to the development of severe schistosomiasis in people(Nwosu *et al.*, 2015; Nwosu *et al.*,2015). But because there are few other ways to prevent contact with water, schistosomiasis has proven to be a difficult disease to eradicate in most impoverished areas of sub-Saharan Africa (Klohe *et al.*, 2021; Melo *et al.*, 2019).

In a national survey in Uganda, Exum *et al.*, (2019), discovered that the prevalence of schistosomiasis in the country was 25.6%, with more cases in the northern and eastern regions. The survey also revealed that over 10 million people across the country were affected by the disease (Exum *et al.*, 2019). *S. mansoni*, which, affects the intestines and is excreted through faeces, was found to be the most common form of Bilharzia in Uganda, while *S. haemotobium*, which, affects the kidneys and is excreted through urine, was less common and only prevalent in four districts of northern Uganda. Additionally, *S. mansoni* wasfound to be prevalent in 81 districts of the country, including Rubirizi (Pearson, 2016b).

Bunyaruguru in Rubirizi district is a region with numerous freshwater bodies that draw a lot of fishermen. However, it is also considered a high-risk area for schistosomiasis infection due to the daily activities of the fishermen, who often engage in activities such as bathing, swimming, and washing clothes in the water bodies. Furthermore, the lack of public latrines nearby leads to some fishermen and fish processors easing themselves in open fields near lake shores, putting them at even higher risk. Despite this, there is limited information available about the prevalence of schistosomiasis in this region, and the factors contributing to its spread. As a result, this study aims to determine the prevalence of schistosomiasis infection among fishermen and fish processors at the landing sites of Bunyaruguru in Rubirizi district, Southern Uganda.

Prevalence of human schistosomiasis among fishermen

In their study of boatmen and fishermen in the Dongting Lake Basin of China, (Guan et al., 2020)found that the prevalence of schistosomiasis among them in Yueyang County was 13.81 percent, which is higher than the average prevalence discovered by the national surveillance system. The authors also point out that it was more common among younger age groups in the population they were studying.

Of the 750 individuals in the Northeastern Brazilian state of Alagoas that took part in a research by Melo *et al.*, (2019), the general prevalence of schistosomiasis was found to be 18%, being 15.9% between the fishing workers and 2.1% among their relatives. This high prevalence was noted to be due to the fishing environment being contaminated with domestic effluent containing schistosome eggs.

The prevalence of *S. mansoni* was found to be 12.4% among the symptomatic residents of a rural Egyptian village on the Nile Delta, which is lower than the reported rates from not only Egypt but also other endemic hot spots in rural communities like Nigeria (17.8%) and Brazil (>20.5%) (Ahmed *et al.*, 2021).

Following a molecular epidemiological study of schistosomiasis in the Central River Region of The Gambia, using microscopy, ELISA and polymerase chain reaction techniques, the prevalence of schistosomiasis was found to be 28.7 with 41.0% in males and 23.9% in females. The study population was made up of fishermen/women, farmers and students. Of these, the fishermen had a schistosomiasis prevalence of 23.8% (Mendy *et al.*, 2020).

According to a systematic review by Hailegebriel, Nibret and Munshea (2021), 29 percent of Ethiopian fishermen were infected with *S. mansoni*, which is almost identical to the 26.6 percent recorded from Egypt. In addition, a study by Fentahun, Hailu and Alemu, (2021) found that there were 22.7 percent of Ethiopian fisherman on Lake Tana who had *S. mansoni*, while a study by Menjetta, Debalke and Dana (2019) found that there were 29.22% of Ethiopian fishermen who had *S. mansoni* altogether. The high incidence of schistosomiasis within the country was attributed to among other factors the favourable geographic, climatic and ecological factors which encouraged the survival of the intermediate hosts; different laboratory techniques and differences in fish catching practices.

According to a field study by Zhang (2019), fisherman on the beaches of Lake Victoria in Kenya were found to have a prevalence rate of schistosomiasis infection that was greater than that of the other communities at 44.7 percent. This the author attributed to people who are occupationally at risk of schistosomiasis infection, having higher prevalence rates.

According to a study by Pearson (2016) in northern Uganda, the overall prevalence of schistosomiasis along the river Nile was 0.8%.The prevalence of *S. mansoni* among individuals examined at each fishing site was 2 percent, 3.5 percent, and 3.5 percent, respectively. Another study in Uganda by Exum *et al.* (2019) noted that the prevalence of schistosomiasis along the water edges was high and ranged from 50% upwards in most of the places within the country. There exists a significant dearth of information about special interest groups such as the fishermen as far as the prevalence of schistosomiasis is concerned which is evidenced in the low number of studies available both within and outside the country. This study hopes to bridge this gap in the study area.

Risk factors associated with human schistosomiasis among fishermen

According to Menjetta, Debalke and Dana (2019), schistosomiasis infection among fishermen was significantly associated with their water contact behaviour. They add that the frequency and duration of activities such as bathing, swimming, using rudimentary fishing gear and river crossing as they get to their fishing spots were strong independent predictors of schistosomiasis infection. It was further noted that only a single exposure of about five minutes was enough to cause infection if the water was infested with infected snail intermediary hosts.

In a study by Moses *et al.* (2021) longer residence time in a community next to a water source considerably increased the likelihood of contracting schistosomiasis infections. The author adds that there is an increased risk of exposure and new recurring infections acquired over time as one stays in the same environment.

According to Fentahun, Hailu and Alemu (2021), a knowledgeable person should take precautions to reduce their risk of contracting schistosomiasis. However, contrary to expectations, they found in their study that awareness of schistosomiasis was positively associated with infection. This the authors associated with the population not having alternative options to influence behaviour change so as to reduce on their exposure. In another study however, it was discovered that majority fisherfolk have little knowledge about schistosomiasis and its aetiology which exacerbated schistosomiasis infections (Exum *et al.*, 2019; Zhang, 2019).

Fishermen have a low mass drug administration compliance rate, which makes them more susceptible to schistosomiasis, according to studies by Stothard *et al.*, (2017) and Moses *et al.*, (2021). According to the authors, the lack of therapy offered, the fishermen's delusion that they are immune, and the unpleasant taste of praziquantel could all be to blame.

Guan *et al.* (2020); Performance Monitoring and Accountability (2020) and Hailegebriel, Nibret and Munshea, (2021) in their studies noted that a high proportion of fishermen who did not use latrines regularly whenever they were out of their homes and those that did not even have latrines at home were infected with schistosomiasis. This was ascribed to the lack of toilets or access to them while at work, loss of privacy due to toilets lacking doors, and unclean or closed communal toilets, which are frequent on landing sites. The authors also observed that even in areas where they existed, there was little use by fishermen, suggesting that they were using open defecation methods that contaminated the environment with faeces containing Schistosoma ova in fields, on the shore, and even in the lakes. Consequently, since these people have little options besides lake water contact, catching schistosomiasis is quite likely (Liang *et al.*, 2018).

Another risk factor to schistosomiasis infection is illiteracy and low levels of education. According to a reports by Zhang (2019); Mulunehe*t al.* (2020) and Klohe *et al.* (2021), attending only primary school or no school at all was

substantially correlated with fishermen's schistosomiasis prevalence. This was associated with fishermen having low knowledge and awareness on the transmission of schistosomiasis.

Young fishermen are more likely to engage in household work or fishing, which increases their exposure to schistosome-infested water and the risk of contracting schistosomiasis as a result, according to studies conducted in China. Studies have also revealed that older fishermen who have spent a lot of time around water can develop an innate immunity to Schistosoma, which in turn offers some degree of protection (Ahmed *et al.*, 2021; Guan *et al.*, 2020).

Menjetta, Debalke and Dana (2019) and Mendy *et al.* (2020) reported that fishermen who also participated in other activities involving contact with water such as irrigation had higher odds of contacting schistosomiasis than those who did not. The study's findings were linked by the authors to skin contact with the cercarial stage of schistosomes while collecting water from reservoirs or carrying out irrigation tasks with bare hands and feet.

Conclusion:-

However, it is also considered a high-risk area for schistosomiasis infection due to the daily activities of the fishermen, who often engage in activities such as bathing, swimming, and washing clothes in the water bodies. Furthermore, the lack of public latrines nearby leads to some fishermen and fish processors easing themselves in open fields near lake shores, putting them at even higher risk.

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